Pictures & How to Clean Them

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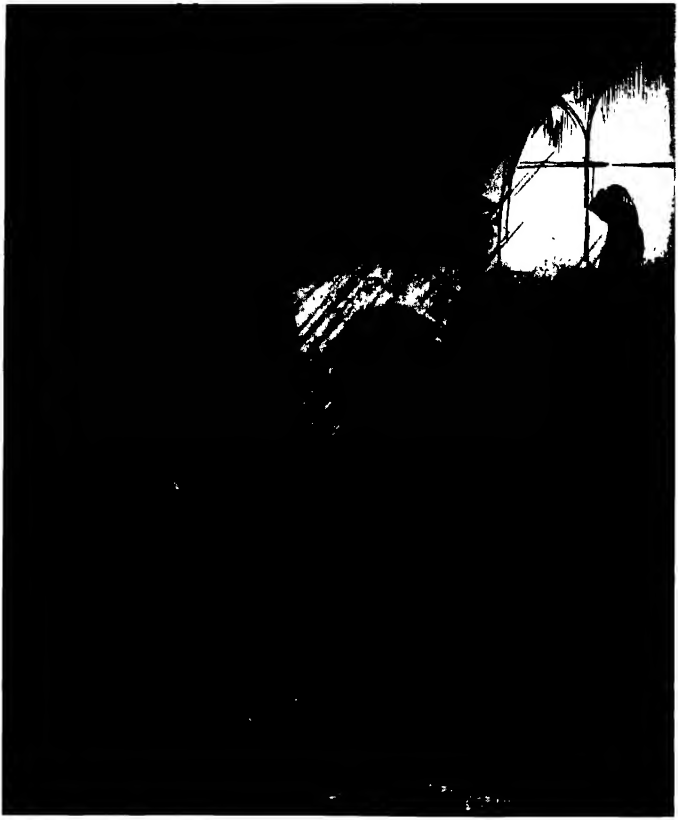

WORKROOM WITH NORTH LIGHT

From an etching by Walfred Huggins

PICTURES & HOW TO CLEAN THEM

TO WHICH ARE ADDED

NOTES ON THINGS USEFUL IN RESTORATION WORK

BY

THOMAS RICHARD BEAUFORT

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PREFACE

THIS little volume will be found to form a striking example of *multum in parvo*, for its two hundred odd pages reflect the experience gained from a life's work on picture restoration. Yet this experience alone would scarcely have formed a sufficient qualification for the authorship of a work such as this; some knowledge of the amateur restorer, his methods and the pitfalls to which he is usually subject, is also necessary if the author is to make his book of real service and assistance. Mr. Beaufort is fortunate in this respect. From pre-War days he has advised on inquiries relating to picture restoration—inquiries which were made by *Art Trade Journal* readers and which were passed to him. He has therefore enjoyed contact, either personal or epistolary, with art dealers all over the country, and he doubtless has better information as to where the average restorer goes wrong than any man living. Obviously such information is the first essential

to advising on the correct procedure for complete success.

This work is thus the natural outcome of a demand for restoration knowledge that has been expressed at various times and in various ways. The requests for general advice on picture restoration received by the *Art Trade Journal* became so prolific, that in 1917 the Editor arranged with Mr. Beaufort for the publication of an exhaustive series of articles covering the whole subject. The last of these appeared in April this year, and the series, reprinted and collated, now appears in its present form. Quite a number of the articles were extended and elaborated at the special request of readers, and the large amount of correspondence which followed, provided very fitting testimony to Mr. Beaufort's efforts. Should the following pages contain any passages that are not as clear to the reader as he would like them, the author would be very pleased to clear away any such apparent difficulties for him.

BERNARD DOLMAN.

September, 1926.

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PICTURES & HOW TO CLEAN THEM

CHAPTER I

THE WORKROOM AND TOOLS

A GOOD workroom and good tools go a long way towards the production of good work. A skilful workman will, of course, get good results under difficulties, and it follows that bad workmen will do bad work, however good their tools may be, but I hold that those who exercise any art should never have their attention distracted from their work by defect of their tools and appliances. I propose, therefore, in this chapter to give a description of the various tools and appliances that I know from experience offer the greatest advantages for everyday work in restoration.

Experience has proved that a large well-ghted workroom is the best and a north or rth-eastern aspect is preferable. In my work-om I have two windows, one facing north, the her south. When restoring oils or water-lours, I use the north, but for nearly all other

work the southern aspect. If it is possible to get a top as well as a side light so much the better, but in any case there should be a good light for working without being exposed to the direct rays of the sun. Everything in the room should be within convenient reach, and there should be sufficient space to conduct all operations in comfort. A large-sized deal table is invaluable, especially if it has drawers. The next and most important item is a sheet of thick plate glass, the thicker the better; a useful size is 28 by 42 inches, for apart from its use while manipulating prints it has the further advantages of being useful as a pasting board, mounting board, water-colour palette, press, and when the day's task is done work can be stowed away beneath the glass and kept quite flat. For years I have used a series of these plate glasses for all the above-mentioned and many other purposes. Indeed, I know of no item that is so useful. As a pasting board the print or sheet of paper laid upon it can be thoroughly pasted and it will not greatly matter if the paste gets on to the glass because after the pasting is finished the glass can be wiped clean with a wet sponge. Used as a mounting board the glass is perfection, and for this reason. Let us suppose a print is to be

mounted on a sheet of heavy Whatman paper. Having pasted our print as above described, we take another sheet of plate glass, and placing this on the bottom of the bath we flush the bath with water and immerse the sheet of Whatman paper therein, allowing the water to flow over the paper for a few minutes in order that it may become pliant and perfectly stretched. The paper will then be quite flat on the glass and may be lifted from the bath; the superfluous water then being allowed to drain off. Several sheets of blotting-paper are then spread over the paper and gently pressed to remove any excess of moisture. After this has been done carefully the paper will be quite ready to receive the pasted print. The pasted print is then laid on the damp Whatman paper and covered with sheets of blotting-paper, which are gently and firmly pressed over the whole surface. By this time the print and its mount will be ready for the final process as follows: Turn up all round about one inch of the margin of the Whatman paper, then carefully paste this inch thoroughly with strong paste, and to make quite certain that it is thoroughly pasted go over it a second time. The turned-up inch of paper is then pressed down into perfect contact with the glass. The whole

is then stood to dry slowly, either in an equal temperature or a slight draught. Do not hasten the drying process—by this I mean don't stand the print near a fire or in the sun, or the print will either leave the glass or dry cockled. Again, if you start drying the print in the open air or slight draught don't take it into a warm room to finish off, or you will have a similar result to that I have just described. I find it better to mount prints at night and let them stand on a shelf in the workroom till the morning, when they are generally dry.

Having decided upon the amount of margin, this is measured and marked with pencil and the print is cut from the glass perfectly mounted and quite flat, without a crease or air bubble.

As a water-colour palette I prefer plate glass. The colours seem to *spend* more freely upon it, and one gets a better idea of their tone and value if a piece of white paper is placed beneath the glass. And lastly, plate glass makes a splendid press, providing your table is quite flat, for after putting a drawing board on the plate glass you can pile almost any weight upon it, whereas with a wooden press the screw is very liable to go with any extra pressure. Moreover, wooden presses are generally made of beech and so liable

to get the tiny beetle that makes the worm-holes and rots the wood.

Zinc baths are often recommended for print restoration. They are useful certainly when employing boiling water to soak off prints that have been mounted with hard mountants on millboards, but in all other processes these baths are injurious because the various solutions used act upon the zinc, and an important point to remember is that zinc is affected by alkalies, which will eventually dissolve it if strong enough.

An ideal bath can be made of plain seasoned wood, for neither water, lime, acids, nor alkalies act very much upon it when they are used in weak solutions. The wooden bath should be made of inch stuff if large work is to be done, and may be constructed as follows: First of all get a large clamped board similar to an architect's or engineer's drawing board. This makes a good bottom for a bath. Next screw on with brass screws 2-inch fillets to form the four sides. At one of the corners of the bottom of the bath make a hole and fit a bung or plug and the bath is complete. It may be urged that this is a rather cumbersome affair, but I do not find mine cumbersome, though it is a very large one.

It is mounted on very strong trestles, and standing over a sink is more or less of a fixture. It has been in use many years, and has never given the slightest trouble or needed repairs. If only used now and then the bath should be damped occasionally or the wood will get too dry and warp.

There is not much mechanical apparatus necessary in restoration work, but besides the ordinary tools there are a number of things that are more or less necessary. Among others, I find the following of great utility, viz. an engineer's or architect's T-square of polished mahogany with bevelled ebony edge, also one or two set-squares for use in adjusting prints squarely on their mounts. A pair of compasses or dividers will be found to be indispensable for measuring margins, etc. A pair of canvas straining pincers and small tack-drawer should likewise be obtained. Several flat hog varnishing brushes, 3 or 4 inches wide, in nickel ferrules, will be useful for pasting. These brushes shed a few hairs till they have been in use for a little while. They should not be allowed to stand in paste, but after use should be rinsed out and hung up to dry.

As regards pastes and mountants, I have

described these at length in Chapter XIV. One or two sponges for wiping the plate glass clean, etc., are also needed. A flat camel-hair brush such as is used for damping the tissue paper of letter copying books is one of the best things for damping the surface of a print, or for lifting off small particles of dust or grit such as are sometimes found adhering to the surface after the final rinsing of prints. This kind of brush is most useful when it is necessary to put broad washes of water-colour or to tint a mount. One or two shoemakers' knives are preferable to mount cutters for trimming paper and prints. A Turkey oil stone of the best quality should be kept for putting a keen edge on trimming knives. Take care to get a slightly hard stone, and while in use see that it is kept oiled, for the stone improves in quality as the oil soaks in. A good stone may sometimes be picked up second-hand and is, I think, preferable to a new one. Use lubricating oil of good quality for oiling the stone. A small hack-saw is handy for cutting off projecting and rusted screws or nails in old print strainers; also a small punch for driving in these nails or those at the corners if loose or weak.

Always keep all steel tools well sharpened and

polished so that rust may not collect on them and then fall upon prints and papers, thereby causing iron mould, which is difficult to remove, even with oxalic acid. Accidents happen in the best-regulated workrooms, notwithstanding one may use every possible caution and foresight; it is therefore as well to have remedies at hand, for promptness of application is often an important factor in the efficiency of a remedy. Every accessory should have its place, so that it can be used at once without any trouble or loss of time. For smoothing out or rubbing down rough places, scratches or creases in paper or prints a burnisher is generally used. An agate is about the best burnisher, such an one as gilders use for burnishing gold. As the quality of an agate is improved by continual use a second-hand one that has had a good deal of wear is preferable to a new one.

The palette-knives commonly sold in the shops are generally made of steel and are useful for scraping the palette, but one of ivory is preferable for spreading or mixing colours, since some of the yellows assume a dingy dark-green hue; many of the greens, too, and other colours experience a change when touched or manipulated with iron or steel palette-knives. After

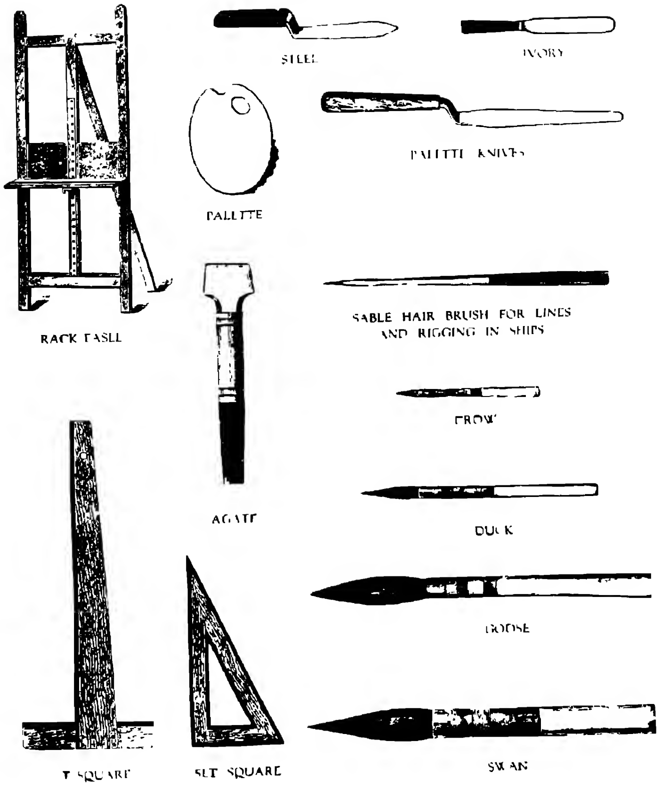
any oil work is finished the palette should be scraped clean of colours, and well wiped with a rag or pad of cotton wool on which there is a little spirit of turpentine.

In no particular ought the restorer who wishes to ensure superiority in the execution of his work be more circumspect than in the choice of colours, brushes and pencils. Oil-colour brushes are either round or flat of various sizes and almost always made of hog bristles. Personally I prefer the flat hog brushes. Pencils differ from brushes, in the smallness of their size, and in being made of sable and camel-hair. The smallest are fitted into quills and placed on sticks. In choosing sable pencils a very simple trial will prove whether they are fit for your purpose. You have only to dip them into a glass of water and bring them to a point on a piece of blotting-paper or sponge. Then, if they present a sharp point and are flexible and springy, the pencils are good. The sharpness of the point is of particular consequence in small pencils. With regard to the stick attached to the pencil, it should not be less than 10 or 12 inches for oil-colour, but may be shorter for water-colours. In mounting a pencil choose a round cedar stick that barely fits the quill. The

pencil should then be dropped into a cup of hot water for a few minutes so that the quill gets quite soft; it should then be wiped dry and pushed softly and firmly on to the stick or holder, and when dry will never slip off again. A mahl stick of bamboo is necessary to steady the hand while painting in oil upon an upright canvas. A rack easel (see illustration) is the most useful form, and if a number of holes are bored as indicated, with a peg to fit them, a long piece of cord tied to peg and attached to the top hole will make the easel more convenient and form a rest for the mahl stick, instead of having to put it on the surface of pictures while working upon them.

There are other articles and tools which it may be desirable, or even indispensable, for the restorer to have among his apparatus, but which do not require any description of their nature or use, or any directions for their selection.

In concluding this chapter let me say that all materials should be the best that money can buy; the best is always good, and any extra money spent in this direction is more than compensated for by the saving of time, labour, temper, and bad language. The right thing of best quality will always beat any cheap substitute,


STEEL
IVORY
PALETTE
PALETTE KNIVES
RACK EASEL
AGATE
SABLE HAIR BRUSH FOR LINES AND RIGGING IN SHIPS
CROW
DUCK
GOOSE
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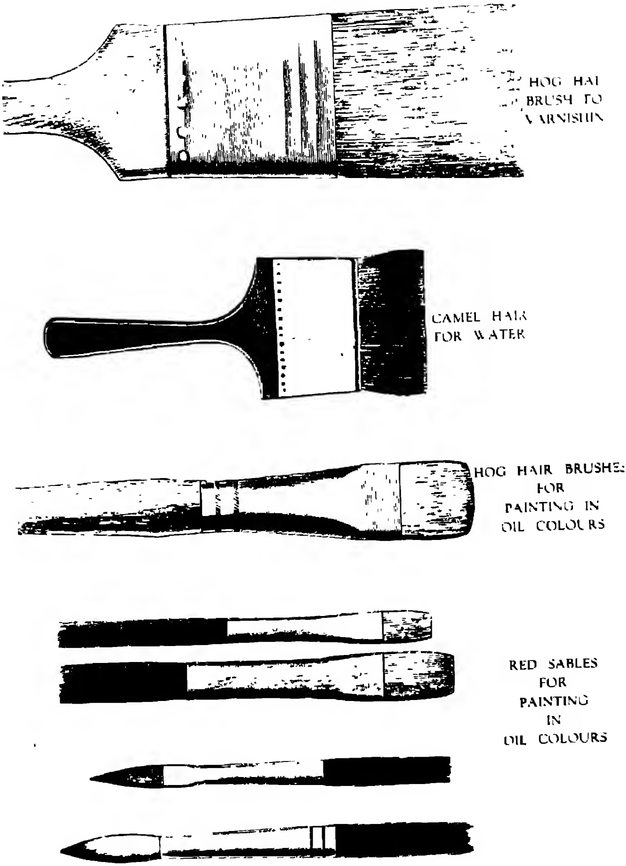
TOOLS. I


HOG HAI
BRUSH TO
VARNISHIN
CAMEL HAIR
FOR WATER
HOG HAIR BRUSHES
FOR
PAINTING IN
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RED SABLES
FOR
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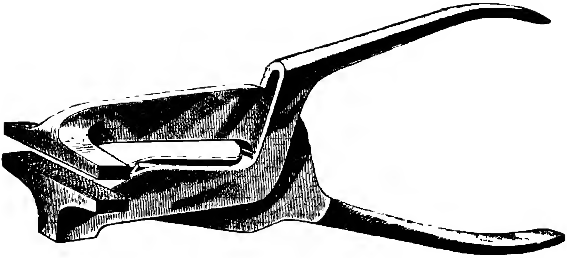
OIL COLOURS

TOOLS. II



CANVAS STRAINING PINCERS

HALF-ROUND FILE ABOUT 10 INCHES
Used sideways to knock out old tacks

PUNCH

TWEEZERS

notwithstanding the shopkeeper tells us "we reject the substitute chiefly because it is new, but let it be presented to us sufficiently often so as to rid it of its unusualness and the chief obstacle to acceptance is removed." But the fact is, we have become so accustomed to an altered condition of affairs by reason of the endless and in some cases senseless restrictions caused by the late war that we had to accept anything we could get in the way of materials and carry on.

CHAPTER II

CLEANING PICTURES

IT may be said that the knowledge of every picture-cleaner is virtually derived from an experimental process, which he on first undertaking the art has carried out for himself, and that he has formed his judgment upon it, and decided upon his own process of carrying on the operation for himself. If you inquire of two or three picture-cleaners, and they inform you candidly as to the methods they pursue, you will generally find that the method recommended by one is condemned by another. There are many methods of working, and results of equal excellence have been produced by each. Some of the most proficient workers adopt one process, others another: each one has his own peculiar mode. Success or failure depends as much upon the agent employed as on the means applied. Restorers differ—so with artists. What would apply to one painter's

work would not to others ; one painter uses as a medium merely oil without varnish, another uses oil and varnish (megilp), another varnish with turpentine ; others will first squeeze their colours from the tube upon blotting-paper to get rid of oil, whilst others will add poppy oil with sugar of lead, and so *ad infinitum*—no two painters paint their pictures in the same way ; no artist, through the whole course of his life, paints his pictures with the same materials ; he changes his materials, and it is therefore impossible to lay down a rule which shall be of general application in picture cleaning and restoring.

Sir T. Sebright, an assiduous amateur restorer, who practised in Rome, was wont to say that there are no secrets about picture-cleaning, and that the processes generally used were either friction or solvents, such as *turpentine, spirits of wine, soap or potash water. As regards soap, potash water or alkalies of any kind, there is not much to be said in their favour, because excellent or satisfactory results cannot be obtained with them* ; on the contrary, there are many disadvantages in using them, so much so that the writer has frequently had pictures brought to him which had been virtually ruined

by their use. On one occasion a dealer bringing such a picture was questioned as to its deplorable state, and it was found that the party had been " monkeying " with, of all things, a soap that won't wash clothes.

In the opinion of some it is preferable to put up with any state in which a picture may be found rather than run the risk of cleaning. For this reason many masterpieces look almost valueless, because being so covered with dirt, the features of the pictures are almost entirely obscured, and it is impossible to see their beauties.

I remember a very dirty panel once being submitted to me with the query " Is it worth cleaning ? " It is true at first sight this picture did not look much, and no doubt the dirt and varnish of two hundred years had prevented its value being recognised, but a careful cleansing revealed a delightful Cuyp, steeped in the calm and luminous atmosphere of evening, with all his subtle method of contrasting and blending of adjacent colours in the golden hue and ruddy ray of a sinking sun.

I mention this particular case because there is very little risk in cleaning Cuyp, thanks to his firm and hard glazing. It is true he sometimes scrumbled his warm yellow or saffron

grounds in the distance, where the sky approaches the horizon; but still it is sufficiently hard to enable an experienced hand not to go too low in cleaning.

Claudes are very difficult pictures to clean, because Claude had a method of scrumbling a film of colour over the whole picture in a very refined way, which produced his peculiar quality of gradation of light and general glow and tone. When cleaning Claudes it is well to bear this fact in mind, otherwise in removing the varnish one is likely to shift the glazing. Again, Paul Veronese had the habit of painting blue draperies for the most part in water-colour, and for this reason there is danger in cleaning his work. Terburg and Metsu are also difficult to clean, because their pictures are generally very delicately painted.

Perhaps of all pictures those of Sir Joshua Reynolds are the most hazardous to clean, because this artist was always experimenting, so much so that he would destroy pictures in order to learn how they were painted. Sir Joshua also made abundant use of copal varnish and bitumen; so did Sir David Wilkie use these two substances, but in a more skilful manner. Haydon is said to have rushed at his canvases

with brushes brimming with asphaltum; and it is quite possible that Turner got some of his effects by similar methods and by toning and glazing. When Turner was asked what he mixed with his colours he answered, "Brains." In cleaning pictures it is necessary to use brains—and plenty.

From this we see that the care required in picture-cleaning is enormous and meticulous; and that one can very easily damage a picture through rudimentary methods or lack of the necessary chemical knowledge of the pigments and solvents to be used in the process of solving and restoration.

In this connection one is inevitably drawn to the question whether a picture sent for renovation really emanates not alone from the artist, but even from the period to which it is attributed. While the office of the restorer is restricted to the work set before him he has for several reasons to verify the pigments used in the original painting. First of all, the pigments used in the original picture may or may not have been *ground-in* and mixed the ordinary way. When I say the ordinary way I mean that they have been mixed in the grinding for the purpose of obtaining a colour or a tint. Some

of these, thanks in a large measure to the varnish rather than the medium, have become comparatively permanent, but when the restorer has to cover " bald " pieces or " work up " the colour or pigments which are dull, the question arises what pigments may be used with safety and due regard to permanence on the portion to be restored.

Chemical affinity and chemical reaction are still problems that puzzle the wisest, and my opinion, borne out by the experience of more than forty years, is that there is practically no chemical test which can be applied that will solve the difficulty. There were pigments, and many of them, used by the older masters, which were practically permanent, for it must be understood that no colour is really permanent. But although we take two colours, each of which is permanent in itself, our trouble is that when super-imposed, chemical action sets in and renders one or both of them more or less fugitive. This is a phenomenon that no amount of writing could explain, nor can experience explain it, but to the man who has handled thousands of pictures, there comes an additional " sense " from experience which shows him how to treat them. It may be, and indeed often happens, that one has to make a good many

experiments with the *margins* of a picture before dealing with the body of it. Sometimes these experiments for finding what emollients to use can be made with the various solvents, but more often than not a microscopical examination of a section of the pigment is necessary before it is safe to start work.

Where pictures submitted to me have been experimented upon I invariably discover that they have been tried either in the middle or some prominent part with methylated spirits, soap powder, ammonia or some other strong alkali which has not only removed the varnish but frequently some of the paint.

Let me now give a hint or two concerning the method of friction, which some consider the safer process, because you lift the varnish by raising it in a palimpsest of white dust, and as long as the dust rises white you are safe. To some extent this is true, but you must be very careful how far you go and you must know where to stop, for if the process is carried too far the paint begins to lift, as you will discover by putting the smallest quantity of the white dust under a microscope. Here is where experience comes in, for a skilful restorer with his eyes shut can tell by the very sensitive tips of his

fingers when he has gone far enough. One grand thing to remember is, don't "skin" your picture; in other words, don't remove quite all the varnish if you wish to preserve the glazings and tones or *coup de maître* of the artist. Carefulness in this respect saves much after-work in the matter of retouching.

In order to clean a picture varnished with mastic the restorer takes a little powdered resin and, dipping the tip of the second and third fingers into the resin dust, so that a very small portion adheres, proceeds to rub gently the top left-hand corner of the picture with a circular movement of the finger-tips. He gradually works right across the picture, then reverses the movement and comes back again to the starting place, continuing the process till the whole surface of the picture has been gone over and all the surface dirt and varnish has been removed. The dust is then brushed off and the picture wiped with turpentine. If the process has been done carefully and thoroughly the picture will be found to be perfectly clean and all that now remains necessary is to revarnish it.

It may often happen that a picture has suffered by its travels and got scratched, or after we have removed the varnish blemishes appear beneath

the varnish. In such cases it is impossible to do without a certain amount of retouching, inasmuch as almost every old picture has been more or less injured, and cleaning necessarily renders such injuries apparent. Indeed, it is doubtful if there are many pure pictures in the world by the older masters; that is, pictures that have not undergone some more or less injurious process. Even in the actual lifetime of Paul Veronese (1528–1588), Boschini says some of his pictures had been injured by injudicious cleaning.

Remarkable skill has been shown by some artists at Rome in restoring the touch of the original master so as to deceive the most competent judges of art, but on the whole cleaning and restoring abroad is less carefully performed than in England.

As to the relining of pictures, this is really a craft by itself, and a good English reliner in my humble opinion has no equal; his work is invariably clean, neat, thorough, and above all his charges are moderate, so much so that it is far the better plan to give out any relining work than attempt to do it oneself. I might add that in very bad cases of damage to oil paintings, as for instance their falling from the wall and the

back of a chair going right through them, it is well to have them doubly lined.

After relining and before attempting to lay any colour or retouching upon an oil painting, one must carefully fill up with " stopping " all flaws, cracks, etc.; for if this be not done the blemishes are bound to show no matter how carefully touched in. Where the injury is a large hole or a piece of the canvas missing, the damage can be made good with a patch of old canvas which should be carefully cut to fit into the damaged part. When these points are accomplished, proceed to *prime* the " stoppings," that is roughly match in patches or damage with the colours of the surrounding parts to serve as a groundwork for the succeeding retouching. Sufficient time must be allowed for the " stopping," etc., to dry, according to the state of the weather; from two to three days will generally be sufficient. The work is then ready for retouching. As this can seldom be done at one painting, no second retouching of colour ought ever to be applied till the former is perfectly dry.

For " stopping " some restorers use whiting and boiled oil, others whiting with patent size, but of all stoppings I prefer one made of about equal quantities of whiting and flake white.

CHAPTER III

VARNISHES AND VARNISHING

IN the last chapter the method of removing varnish was described; let us in this deal with the method of revarnishing a picture. Before doing so it would be as well to give some account of the various varnishes in use.

A varnish to be really good, ought to be limpid, brilliant, transparent, and durable. The durability of a varnish is its greatest and rarest excellence.

The foundation of all varnishes are gummy and resinous substances; and the only liquids that can be combined with them, so as to form varnishes, are oils, and spirit of wine.

The principal gums and resins used for varnishes are copal, shellac, and mastic. The solvents chiefly employed are spirits of wine and spirits of turpentine.

Speaking generally spirits of turpentine are always good in proportion to their inflammability —that which burns most readily being the best.

The smell, too, of the inferior kind is more unpleasant and less powerful than that of the better sort. When doubts are entertained as to its purity, pour about two tablespoonfuls into a saucer, and place it to evaporate in the sun, which it ought to do entirely in the course of two or three hours; if a greasy sticky residuum is left, it is a proof that the turpentine is adulterated, or not sufficiently rectified, and ought to be rejected.

Mastic is a resinous substance, the product of the tree *Pistacia Lentiscus*, a native of the Levant, and particularly abundant in the island of Chios. It is obtained by making transverse incisions in the trunks and branches of the trees, whence the mastic slowly exudes. The best is in the form of dry, brittle, yellowish, transparent tears; it is nearly inodorous, except when heated, and then it has an agreeable odour; chewed it is almost insipid, feeling at first gritty, and ultimately soft; it is used in medicine, but its virtues are trifling. Mastic resin dissolved in boiling alcohol and in spirits of turpentine yields a tender and glossy varnish which is largely used for varnishing oil paintings, but this varnish yellows with age, and becomes cracked and fissured.

Mastic varnish is usually prepared by dissolving the mastic resin in spirits of turpentine. In order to prevent the mastic from agglutinating, warm powdered glass, or warm fine white quartz sand, may be added to the resin before it is mixed with the solvent.

Sir Arthur H. Church, late Professor of Chemistry at the Royal Academy, says the following recipe gives a varnish which contains nearly 25 per cent. of its weight of mastic, but the proportion may easily be increased or diminished.

14 ozs. of mastic.
44 ozs. of spirit of turpentine.
6 ozs. of powdered glass, or fine sand.

When the mastic has dissolved the varnish is allowed to cool, and then poured off into a closed glass vessel, in which it is allowed to rest until perfectly clear. Or it may be cleared by filtering through a plug of dried cotton fitted into a funnel. The funnel should be covered with a glass plate for the purpose of preventing any escape of vapour during the process of filtration.

The varnish prepared according to the above recipe is nearly colourless, and leaves a brilliant

glassy surface. But this surface is very brittle, and easily rubbed by gentle friction with the finger; in fact, it consists of little more than the original mastic resin, the fragility of which is well known. To get over this brittleness, various remedies have been devised. Sometimes, Venice turpentine, Canada balsam, or Elemi resin is introduced in small quantities, not exceeding one-seventh in weight of the mastic used. In consequence of such admixture of a natural soft turpentine, the varnish produced dries more slowly, and leaves a less brittle and tougher surface. Ultimately, however, these balsams become brittle like mastic itself. This remedy is, therefore, of a temporary character, but, at the same time, these additions do not interfere with the ease with which the varnish, when old and discoloured, can be removed from a painting by means of solvents or of friction, without injuring the glazing pigments and colours which may be immediately below it; they also render the varnish easier of application.

Many other substances, such as fixed oils and liquid paraffins, have been recommended to toughen a spirit varnish. In many French mastic varnishes camphor is introduced. The camphor, however, gradually escapes by volatil-

isation, the varnish losing its lustre, and becoming brittle and fissured. It has also been recommended to employ oil of spike lavender instead of oil of turpentine in making mastic varnish, but the only advantage is that the varnish thus prepared shows less tendency to " bloom " than the ordinary kind.

Copal, improperly called gum copal, is a singular kind of resin that exudes naturally from different large trees, and is imported partly from America, and partly from the East Indies. The best copal is hard and brittle, in rounded lumps of a moderate size, easily reducible to a fine powder, of a light lemon yellow colour, beautifully transparent, but often, like amber, containing parts of insects and other small extraneous bodies in its substance. It has neither the solubility in water common to gums nor the solubility in alcohol common to resins, at least in any considerable degree. It may be dissolved by digestion in drying linseed oil and other volatile menstrua. This solution forms a transparent varnish, which, when properly applied, and slowly dried, is very hard and very durable. Much of the copal varnish of commerce is not made from true copal or animé at all, Cowry, or Kauri-pine resin (Maori name

for the tree *Agathis australis*, formerly *Dammara australis*), which is much easier to dissolve, being employed instead—the product, however, is decidedly inferior. Sir Arthur H. Church tells us that sometimes several resins are mixed together in the preparation of a so-called copal varnish. A guarantee of genuineness, in which the name or names and proportions of the resin or resins employed is inserted, should always be demanded when buying copal varnish. The various copal-like resins employed in varnishes to prevent brittleness and cracking all vary much in composition and properties, although they resemble one another in their solubility. They are, however, on the whole, unsatisfactory resins, and so far as picture varnishing is concerned the "best picture mastic" is the proper varnish to use.

During the late war it was very difficult to procure many chemicals used in restoration work, and when one did get even small quantities they were very frequently sophisticated, so much so that to render them fit for use one had to resort to various expedients. The following is one to increase the strength of common rectified spirits of wine, so as to make it equal to that of the best. Take a pint of the common spirits

and put it into a bottle, of which it will only fill about three-quarters. Add to it half an ounce of pearl-ash or salt of tartar, powdered as much as possible. Shake the mixture frequently for about half an hour, when a considerable thick sediment will be separated from the spirits, and will appear along with the undissolved pearl-ash, or salt, at the bottom of the bottle. Then pour the spirit off into another bottle, being careful to bring none of the sediment or salt along with it. To the quantity just poured off, add half an ounce of pearl-ash, powdered as before, and repeat the same treatment. Continue to do this as often as you find necessary, till you perceive little or no sediment: when this is the case, an ounce of alum powdered and made hot, but not burned, must be put into the spirits, and suffered to remain some hours, the bottle being frequently shaken during the time; after which the spirit, when poured off, will be found free from all impurities, and equal to the best rectified spirits of wine.

In varnishing, the strictest cleanliness is required, and seeing that as a rule sufficient care is not taken where the varnishing of pictures is concerned, a few words may not be out of

place as to the method of procedure. In the first place, before varnishing, it is well to warm the canvas slightly and then, if the picture is at all loose or slack, tap the wedges of the stretcher so as to make it fairly taut. It also facilitates the process of varnishing if the varnish be slightly warmed, but above all things varnishing should be done in a dry warm room free from dust.

The picture should then be gently rubbed or wiped over the entire surface with an old soft silk handkerchief, in order that all dust may be removed. Next, take a saucer or shallow dish —an old sardine tin makes an ideal varnish receptacle if the edges are smoothed, and if a piece of stout wire be soldered across the top about a third from one end. The wire not only makes a standing support for the brush while varnishing pictures, but is very useful for drawing the brush across in the event of too much varnish being taken up.

Before commencing to varnish slightly warm the tin or saucer. Having poured out sufficient varnish, take a perfectly clean brush, and dip it therein sufficiently to make it moderately full. Having laid your picture on a flat surface, commence your varnishing at the top left-hand

corner with a swift flat stroke of your brush from left to right; then take off your brush and place it just below the point at which you began. With another swift stroke sweep across the picture, and so continue till the whole picture is varnished over. If the operation has been carefully done, a beautifully smooth coat of varnish will be the result.

A very handy varnish pan may be made of two empty sardine tins. Fill the lower tin with *dry* silver sand and carefully solder the second tin on top of this. When any varnishing is to be done the pan is stood on the hob for a few minutes to warm the sand. The pan is then removed to the work table and the varnish poured in, and being kept warm by the sand, flows readily and smoothly from the varnish brush.

Should the brush drag or not work smoothly, the varnish is probably too thick and needs diluting with a little turpentine. Care, however, should be taken in not adding too much turpentine, or the work will be uneven and streaky.

If after varnishing the work looks patchy, uneven, or streaky, do not attempt to retouch it with the brush, as it will probably only make matters worse. It is much the better plan to

lay the picture by till it is thoroughly hard dry, and then friction the varnish off and revarnish.

As what has just been said applies more particularly to fairly clean paintings, it may be necessary to add a few words on the cleansing of very dirty pictures. It is not advisable, as I have already stated, to use alkalies on oil paintings, but when the varnish is found to be encrusted with dirt and the dust of ages, lukewarm soap and water may be applied gently with a sponge or chamois leather. Great care should be taken, every time after the sponge or leather has been passed over the varnish, to rinse it in clear warm water, and to squeeze it thoroughly out before it be again dipped into the soap and water. Castile soap, which is made of olive oil, is the best soap to use.

And now as to brushes, in which above all things cleanliness is essential. After either painting or varnishing has been done every brush or pencil should be washed out, thoroughly rinsed in warm water, and shaped before it is laid to dry. Although this involves a considerable amount of trouble, the advantages resulting therefrom are many. It lengthens the life of the brush and enhances its suppleness, for a good hog-hair brush by frequent washings will

become almost as soft as sable. Above all, there is the pleasure of working with clean tools, for without these good workmanship is unattainable.

Some workmen consider the thorough washing of brushes unnecessary, and often content themselves by rinsing them in turpentine, and wiping them with a rag. This is most injurious to brushes, for turpentine has the effect of making the bristles of a brush brittle. It is also essential never to let a brush get hard dry with either varnish or paint in it, for it will ruin the brush.

If by any chance a brush has been put away without having been cleansed, and the paint or varnish has got hard dry, it is not the slightest use trying to remove either the paint or varnish with turpentine or soap. The best method is as follows. Take a fairly large gallipot and put into it enough soap powder and boiling water to make a very strong solution and three parts fill the pot. When cool drop the brushes into the solution and let them stand for two or three days or such time as it takes to soften out the paint or varnish. The brushes are then thoroughly washed with boiling water, and finally well rinsed with cold water. This is

very important, for any trace of soap left in the brush will not allow painting to dry hard.

As to brushes themselves, some use a flat camel-hair brush similar to those used for damping the paper in letter-copying books, others prefer the hog-hair brush ; but if it can only be obtained, an old Chinese lac brush is the best of all brushes for varnishing. Such a brush is costly, but with care will last a lifetime.

CHAPTER IV

CLEANING VARNISHED PRINTS

SO as to furnish a concrete example, it may be well to describe in detail the process used on the coloured varnished print here reproduced. The print in question is a portrait bust of Linnæus, the Swedish naturalist. In order that the state of the print may be seen, we will clean one half and leave the other half *in statu quo*. Let us take a porcelain dish such as is used by photographers, or, better still, an enamelled iron dish. The print being in very dirty condition, both back and front, we first of all take a small piece of new bread or dough and rub over the back of the print in order to remove as much of the dust and dirt as possible. After doing this, we turn over the print and decide to remove the varnish from the right-hand side. Let us now take a damp sponge and wipe the half of the print we have decided to clean. The object of doing this is to remove anything

VARNISHED PRINT HALF CLEANED

that may have accumulated on the varnish, such as gum, fly marks, etc. In the event of there being any drops of candle grease, they should be gently scraped off with the finger-nail and the place should be cleaned with a pad of wool dipped in turpentine. We now take our enamelled dish and lay the half side of the print we are to clean on the bottom of the dish, and gently pour over it a small quantity of methylated spirits, and with a flat broad camel-hair brush (of the type already described) proceed to wash the print; after a few moments we shall find that the spirit has dissolved part of the varnish and become soiled a deep yellow colour. The spirit should then be poured off and some fresh added, while we proceed as before. After several applications of fresh spirit, we shall find that the varnish has dissolved and left the print, and the paper has become stained with a dirty yellow stain. We now take the print from the bath and lay it on a piece of clean blotting-paper so as to absorb any superfluous methylated spirit and allow it to evaporate. While this is being done, we clean the dish thoroughly, after which we again lay the print in the dish and soak and rinse it very thoroughly with running water. At first the water will be repelled by what

remains of the spirit in the print, but after a time we shall find that the running water has cleared the spirit. Our print is now ready for the bleaching process. Then we decide as to our bleaching solution, and here arises one of the difficulties of print-cleaning. There are many bleaching solutions in use; one called *Eau de Javelle*, or Liquor Potassæ Chlorinate, is made by dissolving one part of carbonate of potash in eight or ten parts of water, and passing chlorine gas through it till fully saturated. Another is called Labarrague's *Disinfecting Solution*, or Liquor Sodæ Chlorate, liquid chloride or hypochlorite of soda. It is made as follows:—Dissolve carbonate of soda, 12 ozs., in 36 ozs. of distilled water, and put the solution into a glass vessel. Mix black oxide of manganese, 4 ozs., and hydrochloric acid, 15 ozs., in a glass flask, with a bent tube attached by means of a cork to its mouth; apply a gentle heat, and with a suitable arrangement cause the gas evolved to pass first through a wash-bottle containing 4 ozs. of water, and then into the solution of carbonate of soda, regulating heat so that the gas shall be slowly but constantly introduced. When the disengagement of chlorine has ceased, transfer the solution which has

GEORGIANA DUCHESS OF DEVONSHIRE

Specimen of a varnished print cleaned and restored

absorbed it to a stoppered bottle, and keep in a cool and dark place.

I have given the mode of preparing the above solution, but unless one is used to chemical experiments, it is far preferable to obtain it from a chemist, and there is no difficulty in doing this, as the Liquor Sodæ Chlorate is used in medicine as a disinfectant, commonly known as chloride of lime. It is also employed as an internal remedy, and for lotions.

Perhaps the most common bleacher in use is chloride of lime, sold under the name of bleaching powder; some say it is troublesome and unsatisfactory to use, but from personal experience I find much of a muchness with all bleaching agents. Some prefer one, some another; care and experience are the main factors in obtaining successful results. But to get back to our print; having rinsed it thoroughly, we will use a solution of chloride of lime, taking a small quantity of this, rather weak to begin with, pour it over the part we wish to clean, and watch the result. The stains will gradually begin to go, and after about five minutes we shall find that they have become considerably lighter. We then pour off the solution and put on some fresh, and continue so doing till we think the

print clean enough. While we are going through with this process, we should continually note and watch if the solution is taking any effect on, or lowering the colours of, the print. If they appear to be going, we should immediately stop the process by pouring off the solution and flooding the print with water. If the print has been entirely printed in colour, there is not much fear of the colour going, provided that great care is taken in the cleaning process and that too strong a solution is not used. It sometimes happens that colour prints (particularly sporting ones) are heightened by water-colours, and when this is the case, the colours are bound to lower and fade somewhat. It is, therefore, always a good plan to make notes of the colours before cleaning, so that when the print is finished, the colours can be retouched.

Having satisfied ourselves that the print in the bath is clean enough, all that remains necessary is to rinse or wash it till every trace of the bleaching solution has left the print. This is best done by letting the water flow gently over it. We then place a piece of plate glass beneath the print and lifting it out of the bath, allow the water to drain off. Several sheets of clean blotting-paper are then spread over the

print, and it is gently pressed on to the plate glass and placed where there is a current of air to dry it gradually. It will then be found to be perfectly clean and ready for sizing, which is necessary if there is any re-colouring or re-touching to be done.

The best size for prints is made by cutting up into shreds a small piece of either parchment or vellum, and letting them simmer in water in an earthenware pot over a slow fire. A good plan is to fit a gallipot into an ordinary glue-pot in place of the receptacle for glue. If it is necessary to mount the print after cleaning, a good paste or mountant is made by putting a small quantity of fine white flour into a basin, and with a wooden spoon pressing it round the sides of the basin. Into the centre of the mass a sufficient quantity of water is poured, and the whole is stirred to the consistency of cream, and then brought to boiling point while being stirred over a clear fire. The paste is then stood to cool, and if, while cooling, a few drops of oil of cloves are added and thoroughly stirred into the mass, it will keep indefinitely.

CHAPTER V

CLEANING AN UNVARNISHED PRINT

IN the last chapter cleaning a varnished print was described. In cleansing an unvarnished print, the process is similar in many respects. Let us take a print that has been unprotected by glass and hanging for years exposed to the atmosphere of a smoking room. On examination, it will be found that the print has become almost black or a very dark brown, and is stained right through with fumes, especially if it has been strained on linen and mounted on a strainer.

The first proceeding is to insert a sharp penknife between the linen and the strainer at one of the corners and carefully run the blade of the knife all round the margin of the strainer. Be particular not to injure the print by cutting the margin while separating it from the strainer. Having separated the linen from the strainer lay the print face downward

on a sheet of thick plate glass in the bottom of a shallow tray or bath. A jugful of lukewarm water is then poured over the back of the print and allowed to soak just through the linen but not through the print. With the thumb and finger of the right hand, the corner of the linen at the bottom left-hand corner of the print is lifted. Holding the corner of the linen firmly between the thumb and finger we lay it back on the print and while pressing the corner of the print on to the plate glass, we gradually draw the linen from the print. If this operation is done carefully, it will be found that as a rule the linen peels off quite easily, leaving the paste on the back of the print.

It is necessary and important, as I have said, to allow just sufficient time for the water to soak only through the linen, and not through the print. The reason for this is that if the water soaks through the paste to the print, one is likely to bring part of the print away with the paste. It sometimes happens that the linen will not come away readily; in such cases it is the better plan to give the print a prolonged soaking until the linen leaves the paper easily. Having got the linen off successfully, the bath is filled with cold water and the print allowed to soak all night.

In the morning it will be found that the paste is quite soft and easily removed with a soft brush. At the same time much of the stain and dirt in the print will have come away in the water in which the print has laid.

The print is then thoroughly rinsed and is ready for the bleaching liquor. The bath is then tilted and the bleaching solution poured in at one end and allowed to flow evenly all over the print; after rocking the bath gently backwards and forwards a few times it is allowed to rest for a few minutes, by which time the print will be nearly clean. To make quite sure of this, drain the bleaching solution off and, lifting the plate glass, examine the front of the print. If the stains have not quite disappeared, immerse the print again in the bleaching solution for a short time, and if after this the stains still remain pour off the solution and use a fresh lot. Thorough rinsing is then given the print, as soon as the stains have gone, by frequently changing the water and emptying the bath entirely. A gentle stream of running water is then allowed to run over the back of the print till all traces of paste and lime have been removed. A good plan is to have a few feet of rubber piping connected with the water tap.

The pipe is put under the plate glass at the bottom of the bath, and the water then quickly clears the print of all impurities. It is a mistake to suppose that the quicker the water flows the quicker the print is rinsed. On the contrary, a steady, slowly flowing stream is best. All the applications of water should be gentle, and it is a good method to tie a canvas bag filled with cotton wool over the mouth of the india rubber piping to safeguard any rush of water; in addition to this the canvas bag will filter out any foreign substance which may get into the water at times when the mains are being repaired.

The print being thoroughly rinsed at the back, a sheet of clean paper is laid over it to enable it to be lifted with safety from the plate glass. The paper, with the print face upwards, is then laid on the plate glass again in the bath and the rinsing finished. After this has been done, the glass with the paper and print upon it is lifted from the bath and stood to drain and dry. If all the various operations are carried out carefully, the print will when dry look bright and as good as the day it was printed. No after treatment will be necessary; in fact, the need of any after treatment is as a rule proof that some part

of the process of cleaning has not been done carefully, or that the chemicals used were either not pure or improperly prepared. Practically speaking, all tap water contains some impurities. It is therefore of importance in making bleaching solutions to use the purest chemicals and distilled water.

As the process of distilling water on a small scale is tedious, it is best to get a gallon or two at the chemist's, for the cost is very trifling. It is advisable, too, to use pure chloride of lime. This, when good, is a perfectly dry white powder, with a faint smell of chlorine gas. If kept in a damp place it absorbs moisture, feels clammy to the touch, and smells more strongly, becoming at the same time rapidly deteriorated. It should, when fresh, contain on an average 35 per cent. of available chlorine. If badly made, or kept too long, it frequently falls far below this standard. The value of a sample can only be satisfactorily judged by chemical analysis, so-called "practical" tests being fallacious.

Now as to a question that has often been put me, "What should be the percentage of chlorine in a bleaching solution, and how is one to know its strength?" The following method may be

used :—A standard test-liquor is prepared by dissolving 100 grains of pure arsenious acid at a very gentle heat, in pure hydrochloric acid. When dissolved, distilled water is added, so as to make up a volume of 10 fluid ounces. Each ounce represents, of course, 10 grains of arsenious acid.

To test a sample of bleaching powder, 100 grains are fairly taken and rubbed well up in a porcelain mortar with a little distilled water. It is gradually rinsed into a measuring glass, and sufficient water added to make up 2,000 grain measures. The mixture is well stirred up and a *burette*, i.e. a graduated glass tube with a small aperture and stop-cock for delivering measured quantities of liquid, filled therewith. Each degree of the burette contains, of course, one-half grain of bleaching powder. A fluid ounce of the arsenic solution is now put into a beaker glass, and coloured distinctly, but not strongly blue, with a little sulphate of indigo. The solution of bleaching powder is now gradually and carefully dropped into the arsenic liquor, with constant stirring, till the blue colour disappears. The number of degrees required for this purpose represents exactly 7·17 of available chlorine, and as each degree contains one-

half grain of bleaching powder, the amount of chlorine in 100 grains is readily calculated. Thus, suppose 20 degrees of the burette have been consumed, then $20 : 100 = 7{\cdot}17 : 35{\cdot}85$, the percentage of available chlorine contained in the sample under examination.

While on the question of chemicals, I might add a few words concerning acetic acid. This acid is prepared for manufacturing purposes by submitting wood to destructive distillation, whence its other names of pyroligneous acid, wood vinegar, etc. A clever amateur restorer, writing to tell me of three prints he had cleaned, "in the same bath at the same time," says he found that two of the prints dried in splendid surface, while the other was seriously marred by a floury deposit. While giving acetic acid as a remedy for the evil, my correspondent says that a jug of water poured over the surface of the print completed the operation. He then adds, "As the acid passes over the affected print a 'sissing' and 'fizzling' occurs; this is merely the action of the acid driving the lime out of the print."

A word or two of caution is necessary here. In the first place it is not wise to have more than

one print in the bath at a time; the "floury deposit" shows that the bleaching solution was not properly prepared by the fact of the lime being precipitated on the print. The *effervescence* is the disengagement of gases caused by the precipitate of the lime uniting with the acetic acid. It is therefore absolutely necessary to give the print more than a mere jugful of water; indeed it should be rinsed very thoroughly in order that every trace of lime and acetic acid be removed. If this is not done, the print is likely to lose its texture and eventually go rotten. Should the "floury deposit" appear on an India print, an application of acid would probably bring the India paper away from its mount. So, too, with certain kinds of Japanese paper; the textures would be destroyed.

Like others, my correspondent assigns the superiority to "liquor sodæ chlorate" as a bleacher, but, after all, there is not much difference "'twixt tweedledum and tweedledee," for liquor sodæ chlorate is merely a solution of chloride of lime and carbonate of soda (*vide* Chapter IV).

CHAPTER VI

CLEANING WATER-COLOUR DRAWINGS

THE cleaning and restoration of water-colour drawings is beset with difficulties, so much so that to those about to undertake it one might offer "Punch's" advice to those about to marry. I will, however, give a few notes as to the process.

The mode of procedure is much the same as for coloured prints in so far as preliminaries are concerned; that is to say, all surface dirt and dust should be removed with a piece of new bread or dough. Some recommend bottle india rubber; but either bread or dough is preferable, because the friction caused by passing the rubber over the surface of the paper is apt to leave a slight trace or smudge thereon, and is liable to make the particular part of the paper where it occurs slightly water-proof and impervious to the action of the water we are about to use on it. If the water-colour is

mounted, the first thing to do is to get the drawing off the mount. If on a thick card-board, get a thin paper-knife and work it gently between some of the layers of the cardboard, gradually reducing the thickness of the mount, till it is of only one or two layers, or sheets, as they are called. When this is accomplished, if the drawing has been mounted with any of the numerous pastes, turn it face downwards on a clean sheet of *white* blotting-paper, and thoroughly damp the back of the cardboard with a sponge; the object of this is to get the water to penetrate the mount somewhat without getting the face of the drawing wet. Next lay the drawing face upwards on a piece of *thick* plate glass, and place it in the bath, with just sufficient water to soak through the cardboard without wetting the face of the drawing. Should, however, the face of the drawing get wet in this early stage of operations, either soak up the water with a piece of clean blotting-paper or gently flood the drawing with water and lift it out of the bath on the plate glass to drain off nearly dry. After this, immerse the back of the mount again in the bath till the paste yields. In no case force, hasten, or try to pull the drawing off before the mount is

soaked sufficiently. If at all stubborn, holding the mount against the jet of steam issuing from a kettle of boiling water will sometimes soften the paste and hasten matters.

When the drawing has been got off the mount, lay it again on a sheet of clean blotting-paper, face downwards, and with a sponge remove all traces of paste, gum, or whatever mountant has been used. The drawing is now ready for the bath, and should be put in face downwards on the plate glass, pressing it into contact with the glass by the aid of the blotting-paper. Then the drawing is gently flooded with running water by a piece of india rubber tubing connected with the tap. After a short time stains and spots will gradually vanish; this can be seen by taking the water-colour out of the bath and looking at it through the plate glass.

More often than not, the stains, spots, or blemishes proceed either from impurities in the cardboard or the paste. When these have been removed the stains go with them while washing the back of the drawing with running water. The drawing should then be lifted from the bath, transferred to a clean sheet of white blotting-paper, and allowed to dry quickly

by laying it near a draught of air; it will then be seen if any spots or stains are left. If any remain, the drawing should be again flooded with water as above mentioned, and while it is thoroughly damp the spots should be touched with a brush full of one or the other bleaching solutions mentioned in a previous chapter. If it is a case of ink stain or rust, a saturated solution of oxalic acid may be used; but with your brush only touch the parts stained, and *remember* that oxalic acid is very powerful and poisonous, and should be used with great care and caution if used at all. Directly it is seen that the stains are disappearing, do not wait until they are quite bleached out, but flush and gently rinse the drawing till all trace of the acid is gone, which you can easily see by dipping a small piece of *litmus* paper in the water. If the drawing has been carefully washed, it will be found on drying that all traces of stains have disappeared, except, perhaps, that the parts which were spotted are lighter in tone than the surrounding parts, and may need retouching with colour, or what is termed stippling in. *Upon this process depends much of the success of the restoration* by painstaking endeavour to adjust and restore, so far as possible, any

missing parts with the touch of the original artist. I fear some restorers regard these things as subordinate to the primary necessity of "getting the job done." The mechanical nature of restoration work is tiresome, but one must discipline oneself into a uniformity of routine. Endless stippling may be a regrettable necessity, but it is a necessity because essential to success.

As I have said, much of the success of restoration depends on stippling. In executing this process, delicacy of touch is required, and one must proceed with the greatest care, without growing impatient of the slowness of the process, for it will be easier to repeat touches, however frequent, than to remove the effects of too hasty work. To acquire a correct method of stippling or spotting, there is no better guide than the study of good stipple engravings. The same advantage may be gained for the process of hatching by studying good line engravings; the difference being that instead of spots in the former, in the latter fine lines are used.

Take care not to place the lines or spots too closely together, but equally apart, repeating the process and filling in any irregularity of

touch as may be necessary; moreover every touch must become perfectly dry before it will bear strengthening by repetition. These re-touchings should be applied with a skilful delicate touch, or a coarse patchy effect will result. In no other way than by this process, when well executed, can the missing parts of a water-colour be made good. Should any part of the hatching appear too prominent it may be softened down with a clean brush dipped in water and wiped out nearly dry on a pad of blotting-paper, and the part touched down to the modified tone needed; for in all stippling or hatching, the brush should be nearly dry of colour. If the strokes, spots, or dots are put on with too full a brush they will dry with a hard and very unsightly edge. As the brilliancy and delicacy of a water-colour more or less depends on the clearness, transparency, and purity of the colours, to this end it is advisable to have a simple palette of reliable colours in tubes. The cake colours made by the good old-fashioned firms are, I think, preferable to colours in tubes; and for this reason, that capsules of colour either dry up or get what is termed *livery*, whereas the cake colours last a lifetime. It is quite

unnecessary to get half the colours usually recommended; indeed, the fewer and purer the colours used, the more brilliant as a rule will be the result.

The following may be mentioned as sufficient for all practical purposes. They have the charm of working well, are for the most part reliable, and moreover possess the inestimable advantages of mixing thoroughly the one with the other. Ivory-black is the richest and most transparent of all the blacks, and is perfectly durable. As, chemically speaking, ivory-black is an animal charcoal, it is better not to bring it in contact with vegetable or mineral pigments. I might here mention, as a general rule, that all water-colours should be kept as pure and transparent as possible; brushes should be washed out until they are scrupulously clean before mixing any tints; let all colours be laid on as clearly as possible, and in washes of colour, should it be necessary to go over the ground again, avoid doing so till the first wash be perfectly dry.

In mixing colours or tints blue-black and lamp-black should be used, instead of ivory-black. Lamp-black is not quite so intense and

FRANCIS 7TH EARL OF NEWBURGH

Specimen of a black and pencil [illegible]

transparent as ivory-black. It covers readily every underlay of colour, and works well; but being a dense solid pigment, it should be used sparingly to avoid heaviness. Blue-black is of weaker body than ivory-black or lamp-black, and consequently better suited for many purposes, especially in landscapes, where a black and sooty effect is to be avoided. Black lead or plumbago, which has only in recent years been employed as a pigment in water-colours, and may be effectively used in retouching pencil drawings, has no action on any colour, and is very endurable. As browns are very numerous, and are almost without exception of great durability, one can select according to taste. Brown madder, however, affords the richest description of shadows, and is especially indispensable. It is, like all the madder pigments, very permanent, dries well, and works very pleasantly. Burnt umber, a quiet brown, works and washes well, and is perfectly stable. Bistre, a very powerful citrine brown, is useful for architectural subjects. It is perfectly durable, but has a tendency to condense the moisture of the atmosphere. It does not wash well—that is to say, succeeding washes disturb each other. Olive green, sometimes called

Dewint's green, is fairly safe, but, generally speaking, is more beautiful than durable, and turns brown in a moist atmosphere. Cobalt blue, though not possessing the body, depth, and transparency of ultramarine, works better. It resists the action of light, but its beauty deteriorates by time, and is ultimately blackened by impure air. Cobalt does not injure or suffer injury from other pigments. Terre verte, or green earth, is a very useful bluish green, not bright or powerful, but very durable, being unaffected by strong light or impure air, and combines safely with other colours. Raw Sienna has more body and transparency than the ochres, and is not liable to change by the action of either light, time, or impure air. Oxide of chromium affords a sober sage green; mixed with white, it yields very delicate and pleasing tints. Being deep-toned, it must be employed with care to avoid heaviness, and it does not wash very well. French blue, or French ultramarine, is a safe and generally useful colour. Naples yellow possesses the advantages of being perfectly durable and trustworthy. What is now sold as Naples yellow is a compound pigment, and may be accurately imitated by mixing deep cadmium

yellow with white. Ultramarine ash works and washes much better than genuine ultramarine and gives very delicate tints.

As a variety of colours is more a matter of choice than of necessity, the above list can be added to, but in doing so it should be borne in mind that the following colours cannot be relied upon to withstand daylight for any length of time, either used alone or in mixture, Prussian blue, indigo, gamboge, brown pink, bistre, purple madder, carmine, crimson, olive lake, and scarlet lake. Antwerp blue is paler and less permanent than Prussian. King's yellow, or orpiment, a bright yellow, *is not durable and, moreover, is a very deadly poison.* Pure scarlet is of all pigments the most dazzling and fugitive. As a landscape colour it is of no use, although for some flowers nothing can approach it; but its beauty is almost as elusive as the scarlet pimpernel, and should have no place on the palette.

In oil-colours vermilion should not be mixed with white lead on account of the sulphur which it contains.

CHAPTER VII

COLOURS AND HOW TO BLEND THEM

THERE are but three *primitive* colours—that is three colours only which cannot be compounded of other colours; namely, red, blue and yellow. With these three colours every tint and shade in nature (except white) may be imitated. With red, blue and yellow, the painter can, on a white ground, represent the bloom of health, and the pallor of disease; the verdure and flowers of spring, and the barren landscape of December, when

> "The cherished fields
> Put on their winter robe of purest white."

It was formerly supposed that there were seven primitive colours, but Sir David Brewster has proved with regard to the colours of the prism, that three of the other colours are formed by the over-lapping of the three primitives, and the seventh by the mixture of darkness or

shade with the blue. In this manner the over-lapping or blending of the red ray with the yellow produces orange, the over-lapping of the yellow ray with the blue produces green, and the over-lapping of the blue ray with the red ray produces violet or purple. This may

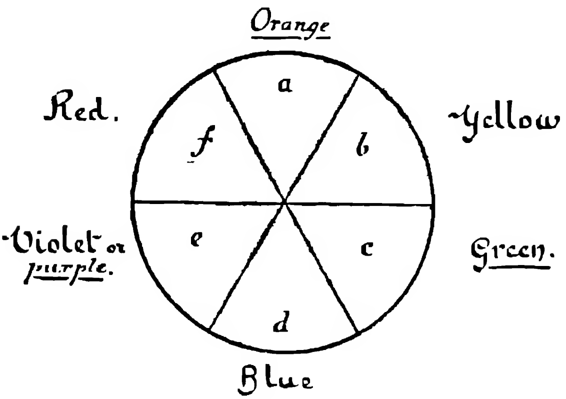


FIG. 1.

perhaps be rendered clear by the diagram. (Fig. 1.)

Let the circumference of the circle be divided into six equal parts, and marked *a*, *b*, *c*, *d*, *e*, *f*. Let the spaces *a*, *b*, *c*, be coloured yellow, *c*, *d*, *e*, blue, and *e*, *f*, *a*, red. It will then be seen that the space *a* is coloured orange by the over-lapping of the red and yellow, the space *c*

is coloured green by the over-lapping of the yellow and blue, and the space *e* is coloured violet or purple by the over-lapping of blue and red. These three colours, orange, green, and violet or purple, are called *secondary* colours, because they are each composed of two primitives.

On looking again at the diagram, it will be seen that the space opposite to each of the primitives is filled by one of the secondaries composed of the other two primitives; red, for instance, is found to be exactly opposite to green, which is composed of blue and yellow; yellow is opposite to violet, which is composed of red and blue; and blue is opposite to orange, which is composed of red and yellow.

It appears to be a law in the science of the harmonious contrast of colours, that when the attention of the eye has been directed steadfastly upon a colour (either primitive or secondary) there is a tendency in the organ to see the colour which in the diagram is directly opposite to it, whether it is actually present or not. If, for instance, a red disk is placed on a sheet of white paper, and the eyes are steadily fixed on it for some time, the red disk will appear to be surrounded by a narrow and very pale circle

of green, or if the eyes, after looking attentively at a red disk, be directed to another part of the paper, and the disk withdrawn, a pale green image of the disk will be perceived. Green, therefore, is said to be the *complementary* colour to red, because the eye, after looking fixedly at the red (one of the primitive colours), sees an image or spectrum composed of the other two primitive colours which together make green. In like manner the spectrum produced by blue is orange, and by yellow is purple. Nor is this phenomenon limited to the primitive colours only, it takes place also with regard to the secondaries, and even to what are called the broken colours; thus red is complementary to green, yellow to purple, and blue to orange. This will be understood by reference to the diagram. The colours thus opposed to each other are called complemental or complementary, and sometimes compensating colours. In every case, these are the most beautiful and harmonious contrasts of colours.

It will readily be understood that the gradations of colour between each of the primitives may be very numerous, by the mixture of more or less of the neighbouring colours. The

gradations are, in fact, so numerous, that it is impossible to name them all. Pure yellow, for instance, inclines neither to red nor blue, but if a small portion of red be added to the yellow, we call it orange-yellow; if a little

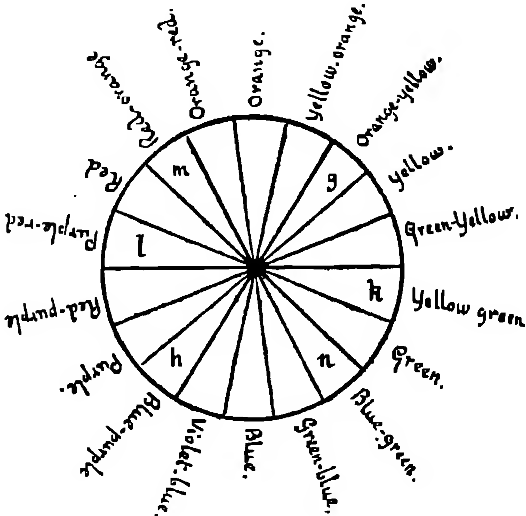


FIG. 2.

blue be added to the yellow, we call it greenish-yellow; if a little more blue, it will pass into yellow-green; thence to pure green; then to blue green; then greenish blue to which succeeds pure blue, and so on. The colour which contrasts precisely with any one of these

colours will be found exactly opposite to it in the circle (Fig. 2). If for example, it is required to find the complementary colour of orange-yellow (*g*) we shall find opposite to it blue-purple (*h*); in the same manner we see that yellow-green (*k*) is the complementary of purple-red (*l*), and red-orange (*m*) of blue-green (*n*). By this arrangement an exact balance of the three primitives is preserved in all the contrasts, and the result is perfectly harmonious.

From the mixture in unequal proportions of the three primitives, or of the secondaries with each other, or with the primitives, other colours are formed which are variously termed tertiaries, quartiaries, and semi-neutrals, and to which various specific names are given; such as citrine, which may be composed of orange and green; olive, composed of purple and green; and russet, composed of orange and purple. To these may be added brown, slate, marrone, straw-colour, salmon-colour, and others of a similar nature, which from the fact that all three of the primitives enter into their composition, may be denominated broken colours.

Harmony of colour is of several kinds; it will be sufficient for our present purpose to

allude to two kinds only, namely, *harmony of analogy* and *harmony of contrast.* The term *harmony of analogy* is applied to that arrangement in which the colours succeed each other in the order in which they occur in the prism, and the eye is led in progressive steps, as it were, through three or more distinct colours, from yellow, through orange, to scarlet and deep red, or from yellow, through green to blue, dark blue and black, or vice versa. The same term is also applied to the succession of three or more different tints or shades of the same colour. The *harmony of* contrast is applied to combinations of two or more colours, which are contrasted with each other, according to the laws of which we have spoken. In the first kind of harmony the effects are softer and more mellow, in the second more bold and striking.

Nature affords us examples of both kinds of harmony, but those of the harmony of analogy are most abundant. Of the more brilliant examples of the last kind of harmony is the beautiful succession of colours in the clouds at sunset or sunrise. Of a more sober kind is that which prevails in landscapes, where the blue colour of the hills in the distance changes

as it advances towards the foreground through olive and every variety of cool and warm green to the sandy bank glowing with yellow, orange, or red ochreous hues at our feet. In both cases force, animation, and variety are given by the occasional introduction of contrasts of colours. In the sky the golden colour is contrasted with purple; the glowing red, or rose colour, with pale green; the blue sky of the zenith and eastern hemisphere contrasts with the orange-coloured clouds which are floating before it, with the peaks of snowy mountains, or the lofty towers of a cathedral standing out boldly against the clear blue sky, and reflecting on the sunlit crags or pinnacles the golden splendour of the western hemisphere. On the earth the broken and variegated green and russet tints of the trees and herbage are vivified and brought to a focus, sometimes by the bright red garments of a traveller, sometimes by flowers of the same colour scattered over the foreground.

For the sake of giving a more marked character to experiments on colour, they are generally conducted with primitives and secondaries, which in their pure state are called positive colours.

Of the three primitive colours, yellow is the

lightest, red the most positive, and blue the coldest. Red and yellow, from their connection with light and heat, are considered as warm colours; blue, from its association with the colour of the sky and distant objects, is said to be a cool colour. Of the secondaries orange is the warmest, green the medium, and violet the coldest. The warm colours are also considered as advancing colours because they appear to approach the eye, the cool colours are also called *retiring* colours from their appearing to recede from the eye. The contrast of green and red is the medium, and the extreme contrast of hot and cold colours consists of blue, the coldest, with orange, the warmest of all colours.

Neither black nor white is considered as a colour; black may be formed by the mixture of the three primitives; grey consists of an equal portion of black and white. When black is placed in contact with any colour it ceases to be neutral, and acquires by contrast a tinge of the compensating colour; if, for example, a piece of green silk is covered with black lace, the black assumes by contrast a reddish tint, which makes it appear rusty; for this reason the mixture of black and green

is not pleasing. In the same manner small portions of white assume the complementary colour of that to which they are opposed, but the general effect of a large mass of white is to make colours appear more vivid and forcible.

A knowledge of the fundamental principles of the harmony and contrast of colours is of great use and helpful in many ways, and if any readers wish further information concerning the more extensive relations and philosophy of colours, etc., they are referred to the very excellent and valuable works on colours by M. Chevreul, George Field, the Baron Frédéric Portal and Mrs. Merrifield.

CHAPTER VIII

MOUNTS AND MOUNTING

AS after either cleaning or restoration of a print or water-colour a mount of some kind is generally necessary, a few words on mounts in general may be useful. A liberal mount sometimes sets off a picture, but in looking at the vast mounts that some artists give to their water-colours, one is reminded of Tom Hood's dying joke when watching his wife preparing a mustard poultice for his emaciated chest; the prince of punsters said, "Isn't that a lot of mustard for so little meat?"

Water-colours, when soft and delicate, may be given a liberal amount of margin. The same rule applies to photographs. Those which are large, strong, and decided in character should be framed close up, whilst those which are smaller and more delicate in style are improved by a margin. Gold mounts are the best possible for water-colours. If real English gold is considered too expensive, then a plain

white surface is preferable to any Dutch metal or bronze mount.

When mounting water-colours it is not advisable to paste the backs entirely. The better plan is to damp the back and then run the paste brush all round the edges for about half an inch. The water-colour is then laid upon the mount and covered with sheets of clean blotting-paper, which should be occasionally changed while the water-colour is drying under the pressure of a sheet of plate glass or drawing-board.

In mounting prints or engravings a thick plate paper is preferable to cardboard, and failing this, a sheet of the heaviest Whatman or some other good make of drawing paper. When the amount of margin to be given is decided upon, the plate paper is laid on the plate glass and the print is put in position, the two top corners slightly marked with pencil on the plate paper. Both print and plate paper are then thoroughly damped with a wet sponge or soft camel-hair brush, so that they may stretch out. The print is then turned face downwards on another sheet of blotting-paper and thoroughly pasted once or twice with a good paste, allowing a few moments to elapse between the first and second pasting, and the

print will then be ready for its mount. First of all see that your hands are free from paste or dirt by rinsing them in water and drying them with a Turkish bath towel. Then taking hold of the print by the two bottom corners, gently lift it and holding it well above the plate paper, gradually lower the print till the two top corners touch the plate paper at the pencil marks. When this has been done, carefully lower the print so that it gradually lays flat on the plate paper mount without a crease. Next take some clean sheets of white blotting-paper, and laying them over the print, press it into perfect contact with the plate paper mount. This is best done by laying a sheet of cardboard over the blotting-paper and smoothing over the whole surface with the hands. After a few moments remove the blotting-paper, which will have absorbed some of the damp from the print and its mount. Replace the blotting-paper with fresh, dry sheets, and then lay the sheet of cardboard over the blotting-paper, with a drawing-board over the whole, and some weights on top to act as a press. In about an hour the pressure is taken off, and the blotting-paper removed, the print being ready for drying off.

For colour prints that have been cut close

or have no margin, either a cut-out Whatman or cream-tinted mount may be laid over them. By using two large angle pieces ⌊ ⌉ of white or cream-tinted cardboard, the effect of the margin can always be seen. These angle pieces are also very useful in photography to decide how much of a photograph should be shown, for it often happens that photographic views show either too much foreground or too much sky, or it may be that the composition would be improved by eliminating something from either side; by laying these angle pieces on the photograph and manipulating them by sliding them one over the other, the best "*bits*" of a picture are soon found and the suitable opening for a cut-out mount shown.

Before I quit this subject, it will not be amiss to add a list of the usual sizes of drawing papers, etc., used for mounting and cut-out mounts.

	Inches.
Emperor	72—48
Antiquarian	52—30½
Double Elephant	40—26¾
Atlas	34—26
Colombier	34½—23½
Imperial	30½—22
Double Crown	30—20

	Inches.
Elephant	28—23
Super Royal	27—19
Royal	24—19
Medium	22—17½
Demy	20—15½
Large Post	20¾—16½
Post	18¾—15¼
Foolscap	17—13½

As regards oil paintings. The mounting of these really comes under the head of relining, and *is best given to a professional reliner to do*. Still, however, as small rapid sketches in oil are sometimes made on prepared oil sketching paper, it may be necessary to mount these on a small panel. This may be done by giving the panel a coat of hot glue. When the glue has cooled, the sketch should be laid upon the glue. And after rubbing a little olive oil over the painting, it is covered with a thin piece of white paper and a warm flatiron passed gently backwards and forwards over the painting. The paper is then removed and the oil wiped off with a piece of wadding. A fresh piece of paper should then be laid on the panel and a weight put on top in order that the panel may not warp but dry flat.

CHAPTER IX

ACIDS USED IN RESTORATION

HAVING seen it stated that " it is a defect in technical books on picture restoration and print cleaning that such volumes rarely or never give the antidote to common disorders liable to trade processes even in the workshop of the practical picture and print restorer," I purpose in this chapter to give some effective antidotes to the banes of picture and print restorers, together with the methods of use and value of certain chemicals of considerable importance from an artistic point of view. In describing them more or less in detail, I will endeavour to give their practical application without confusing my readers by going too much into technicalities, more especially as some correspondents from time to time have given me *formulæ* and recipes of chemicals used in art as they say " without entering upon the chemical reason for the difference in results."

It may be instructive and useful to give a short description of some of the properties and qualities of these chemicals. Besides, it is as well to know the danger attached to handling in ignorance chemicals which are in everyday use.

In Chapter VI and throughout this work I have condemned the use of any colours or substances which contain poison, and it cannot be too strongly impressed on the mind of any who use them that mineral poisons of every description are as effectually taken into the system of the body by handling them or inhaling their fumes as by actually swallowing them; and that the consequences, though not so immediately fatal, are as certainly injurious. Oil of turpentine, and some other substances used in painting and restoring, give out fumes which, though not of a poisonous nature, are apt to occasion a slight feeling of nausea. To remedy this, tobacco in any form is the most powerful check to a substance acting to produce spasms by suspending the muscular action in the stomach.

For instance, a few drops of muriatic acid, diluted with a wineglassful of sugared water would be harmless, but *sixty* drops taken neat would be a fatal dose, although death

might be delayed for some weeks. Again, it is positively dangerous to use this acid in a room in combination with chloride of lime, owing to the fumes given off while the " sizzing " and " fizzing " or effervescence (see Chapter V) is taking place. It is not only destructive to human but fatal even to plant life.

This fact was brought home most unpleasantly to a friend of mine who had a very large greenhouse containing a collection of rare ferns and a climbing rose tree which became infested with *aphis* (green fly). One evening he thought he would kill the green flies by fumigating them with a small jar of chloride of lime in which he had put some muriatic acid. After watering the ferns he put the jar in the centre of the greenhouse and carefully closed the place for the night. The next morning the green flies were dead and so was *every* plant in the greenhouse. The " sizzing " and " fizzing " had done its work very thoroughly. Therefore, of this noxious acid one should say as Falstaff said of honour and Macbeth of physic, " I'll none of it."

As I have said before, I do not recommend re-agents, and there is no need for them if

the various bleaching solutions are made up properly and purely in the first instance by a chemist.

If this and other noxious acids must be used, care should be taken to use them only in the open air, and on no account should the bottles containing them be left about. Nitric acid, or aquafortis, is another dangerous acid, although one of the most useful with which the chemist is acquainted. It is strongly acid and highly corrosive, and is much employed in the arts for etching copper plates for engraving, and combined with muriatic acid it forms *aqua regia* (nitro muriatic acid), used as a solvent for gold, platina, etc.

The acids are a numerous and important class of chemical bodies. They are generally sour; usually, but not always, they have a great affinity for water, and are readily soluble in it; they change most vegetable blue colours to red, and they unite readily with most alkalies, and with earthy and metallic oxides. Some are natural, some artificial, and some both; some are gaseous, some liquid, and some solid, at common temperatures; some are transparent, and others coloured; some inodorous, and others pungent; some volatile, and others

fixed; so that they vary greatly, except in the qualities first named. No simple or elementary substance has the properties of an acid, and consequently all acids are compounds of two or more of them. In almost every case one of these elements is either oxygen or hydrogen, producing the *oxacids* and the *hydracids*, the former of which are by far the most numerous. In some instances oxygen gives rise to different acids by combining with the same element in various proportions.

Acids occur in all the kingdoms of nature; the phosphoric acids which exist in bone are of animal origin; the citric and the oxalic acids are products of vegetation; the chromic and arsenic acids enter into the composition of certain minerals; and many of the acids which are derivable from two or more of these sources are produced by chemical agency.

The acids which are of any importance in art are as follow:—

Oxalic acid. This is one of the powerful and poisonous acids. It is found, combined chiefly with potash, in the juices of plants of the genera *Oxalis* and *Rumex*, whence it has been termed salt of sorrel. It is usually prepared by the action of nitric acid upon sugar,

evaporating the solution, after the action has ceased, to the consistence of a syrup, and re-dissolving and re-crystallising the crystals which are thus procured. It forms colourless transparent prismatic crystals, which are in-odorous, intensely and unpleasantly sour, and do not grow moist on exposure. If they become damp, some nitric or sulphuric acid used in their preparation has not been thoroughly removed. In its external appearance, oxalic acid bears a strong similarity to Epsom salts (*sulphate of magnesia*), for which unfortunately it has been frequently mistaken. It is instantly distinguished from Epsom salts by placing a small crystal upon the tongue; when its strong acid taste, compared with the nauseous bitter of the sulphate of magnesia, will be quite a sufficient test. Oxalic acid is soluble in its own weight of boiling water, but requires eight times its weight of water at 60° Fahrenheit.

It is useful in removing ink stains, iron moulds, etc., from linen, leather, and paper, but should not be employed too strong; the best proportions for these purposes are 1 ounce of the acid to a pint of water. The most delicate test of the presence of oxalic acid is a salt of lime or lime water, with either of which

it forms a white precipitate, insoluble in water, but soluble in acids.

Sulphurous acid is formed whenever brimstone is burnt in atmospheric air; it is a suffocating and pungent gas, and dissolves to a considerable extent in water. Sulphurous acid, if exposed to air and moisture, gradually takes up an additional equivalent of oxygen, and is converted into sulphuric acid.

Sulphurous acid bleaches vegetable colours with great rapidity, and is therefore employed in bleaching wool and silk. The colours thus bleached are not, however, entirely destroyed, as in bleaching with chloride of lime, but merely masked, and can be made to reappear by means of alkalies, sulphuric acid, etc.

Tartaric acid is used for the same purposes as citric acid and is much employed in the arts. Although it exists in many kinds of fruit, it is chiefly obtained from the juice of grapes. It is procured from the cream of tartar (bitartrate of potash) by purifying the crust which separates during the fermentation of wines by solution and crystallisation. In a pure state tartaric acid forms large colourless crystals which dissolve readily in water. It is frequently sold in a fine white powder to

conceal impurities. The chief adulteration met with is by means of bisulphate of potash.

To prevent any organic matter, such as paste, from undergoing fermentation and putrefaction, carbolic acid is the most powerful agent. It is a colourless oily liquid, having no action on litmus paper. To many people the smell of this acid is unbearable; when such is the case, oil of cloves may be substituted, this being equally useful as a preservative for paste.

Citric acid exists in numerous fruits, particularly those of the orange kind, such as the lemon and lime, either alone or with malic and other acids. It is, however, principally obtained from the lemon (*citrus limonum*), and is colourless, inodorous, and extremely sour. It is soluble in cold, and still more in warm, water. The impurity to which crystalline citric acid is most liable is *tartaric acid.*

If adulterated with sulphuric acid, as sometimes occurs, the crystals will be damp, and when dissolved in distilled water, mixed with pure hydrochloric acid, and tested with a solution of the chloride of barium or nitrate of baryta, will give a white precipitate. Besides these impurities, citric acid may be bad owing to its having been made from inferior or

decayed fruit. It is used as a discharge in calico printing, and is also much employed to decompose alkaline carbonates.

Carbonic acid occurs very abundantly in nature, combined with lime, magnesia, etc., from which it is easily separated by the addition of nearly any of the other acids. This gaseous acid is also formed in very large quantities during fermentation, the respiration of animals, the combustion of bodies containing carbon, etc. Carbonic acid gas is destructive of animal life and combustion. Although it undoubtedly affects paper, linen, etc., I have not known it to exert any destructive or modifying influence upon the colours of colour prints. In prints where the paper has become almost dark brown with carbonic acid, I have found after cleaning that the colours have come up as bright and fresh as when they were printed.

CHAPTER X

ALKALIES

HAVING described in the last chapter the acids useful to the picture restorer, it may be as well to say a word or two on the properties of the alkalies. The distinguishing characteristics of these bodies are a strong, acrid, and powerfully caustic taste; a corrosive action upon all animal matter, destroying its texture with considerable rapidity; exposed to the atmosphere, when in their caustic state, they absorb carbonic acid with great rapidity, and become carbonated. It may be well to remind the reader that the action of alkalies upon vegetable colours is various. Some brighten colours generally, while others change them, and in some instances destroy them. With some, yellow is changed to a red brown, with others, red, blue, violet and many other purple vegetable colours are converted to green. The value of the alkalies being of considerable use in the arts, I will in this

chapter treat them somewhat in detail. They are four in number, namely, ammonia (or volatile alkali), potass (or vegetable alkali), soda (or mineral alkali), and lithia, which last is of little importance. Ammonia is perhaps the most formidable of alkalies, and requires to be used with the greatest caution. It is a limpid, colourless fluid and has a very strong, pungent odour, an extremely acrid taste, and corrodes the skin. It is useful in dissolving many of the metallic oxides, also oils, resins, and many other vegetable principles. Its affinity for carbonic acid is so powerful that it rapidly attracts it from the atmosphere—hence the necessity of preserving it in small glass bottles, fitted with ground stoppers, to prevent the absorption of carbonic acid.

Potass or vegetable alkali. The original source of this alkali is in the vegetable kingdom. When wood is burnt and the ashes lixiviated with water, boiled, strained, and evaporated to dryness, an intensely alkaline mass is obtained, which is known by the name of potash, from this process being conducted in iron pots. Potass is employed in soap-making, especially for the softer kinds of soap.

Soaps consist of any of the three alkalies,

soda, potash, and ammonia, in combination with one or more of the fatty acids. A good soap should be free from impurities and neutral, the alkali and fat being duly balanced. The quality of the fats employed is of the highest importance. For the use of the artist only the following should be employed, singly or in mixture—tallow, palm oil, coconut oil, olive oil, rape seed oil and its congeners. The superiority is generally assigned to tallow. Nevertheless a technological authority of high standing, Mr. J. W. Slater, holds that well-made palm and coconut oil soaps are preferable to any tallow soap.

Soap powders, generally speaking, consist of common carbonate of soda crystals reduced to a fine powder. This powder differs in nothing from the ordinary crystallised carbonate of soda; it contains equal quantities of carbonic acid and of water. Being, however, in a state of fine division, it is much more rapidly soluble in water.

Very great care should be taken to secure *pure chemicals*, and in the preparation of chemical solutions the vessels used should be free from grease or impurities of any kind. The alkalies should never be used in strong

solutions; indeed, it is a sound rule to use weak solutions. If results do not speedily occur, the solution should be made a little stronger, as it is safer to err on the side of too weak than too strong a solution. The former fault only protracts the process, and is quite remediable, but if the opposite error be committed, as is too generally the case with alkalies, which are all more or less powerfully corrosive, one is likely to destroy the pictures rather than clean them.

Corrosive sublimate, otherwise perchloride of mercury, is a compound of mercury with chlorine. It is a colourless crystalline body, soluble in water, ether, and alcohol. Anciently it is said to have been used as a mordant for murexide, the Tyrian dye or Roman purple, which was extracted from two little shell-fish entitled *Murex* and *purpura*, that were fished for on the coasts of Phœnicia, Northern Africa and Greece, and around all the Mediterranean Isles. This purple, of a reddish-violet colour, was much valued by the Roman Emperors, who forbade the common use of it, and from this restriction arose the phrase referring to those sovereigns of assuming the purple.

Corrosive sublimate with the iodide of potassium yields a beautiful scarlet precipitate, known as "geranium red"—the iodide of mercury which is used as a paint. Taxidermists employ this to kill insects and to preserve specimens. The property of coagulating various animal and vegetable matters has led to the employment of corrosive sublimate for preventing the decay of timber, prints, etc. In the process of "Kyanising" wood (so called from its inventor) a solution of corrosive sublimate is forced into the vessels of the timber under pressure, when the sap is rendered insoluble and putrefaction prevented. It certainly will remove mildew from prints, but, as I have before remarked, I *am not in favour of using poisonous substances.* I again deprecate their use, particularly in the case of so dangerous a one as corrosive sublimate, and for the following reasons:—Dangerous symptoms have arisen from its use as an antiseptic solution in surgical dressings. External applications in the form of lotion or ointment may even cause death. An extensively advertised "skin tonic" was found to contain 1·6 grains of corrosive sublimate, and in a case before the Dublin Law Courts it was shown to have produced symptoms of mercurial

poisoning. Apart from the danger of touching and handling this substance, there is the danger of inhaling its vapours and getting it into the body by way of the lungs. Suffice to say that even so small a quantity as *three grains* is a fatal dose. It is best, therefore, not to use so deadly a poison in removing or preventing mildew in prints.

As a matter of fact there is no way of preventing mildew if a print be exposed to a damp wall or be kept in a damp portfolio or cupboard. Slight cases of mildew may be removed by immersing the print in boiling water, after which it should be allowed to drain and then flooded with pure spirits of wine.

Another method for bad cases is a bath of permanganate of potash and thorough rinsing, followed by a bath of oxalic acid and further rinsing.

Mildew and mould consist of minute forms of fungi, found on various deceased or decaying substances. These names are generally applied indifferently to a multitude of hyphomycetous, physomycetous, and coniomycetous fungi, but some of the more common ones are especially distinguished. Thus the ordinary "blue mould" is *Aspergillus glaucus*, another still

more common blue or green mould is *Penicillium glaucum*. The harmful results arising from these minute fungi are formidable, and unfortunately they possess most effectual means of increase, for the mycelium creeps into the tissue of the paper and thence spreads gradually throughout the whole surface, practically destroying all its texture. At times there may seem to be only a few spots, but it is well to remember that the actual mildew, as it appears to the observer, represents only a fraction of the system, being simply that part which is concerned with the production of spores. To prevent the action of moist atmosphere upon walls a solution should be made as follows :—Dissolve three-quarters of a pound of soap in ten pounds of boiling water. Any walls exposed to moisture should then be coated with this solution. Take care in applying the solution with a clean whitewash brush not to form bubbles. A little alcohol assists in dissolving the froth, and causes the solution to penetrate deeper into the wall. This first coat should be left for twenty-four hours or even longer if it is not dry and hard. A second coating should then be given with a solution composed of about half a pound of sulphate of alumina

in thirty pounds of water. The work should be done in dry weather.

People who are unfortunate enough to live in damp houses, near undrained land, should have planted near the house laurels and sunflowers. The laurel gives off plenty of ozone, whilst the sunflower destroys the malarial condition. Few people are aware of the anti-malarial properties of the sunflower. The Helianthus or sunflower is an extensive genus of plants, and in planting them the perennial kinds should be chosen; if given a place to themselves they will increase rapidly and flower beautifully in early autumn.

CHAPTER XI

CHEMICAL SUBSTANCES, SIGNS, ETC.

AS it is my aim to furnish in the compass of this little work as much information as possible connected with anything appertaining to the art of restoration, I will devote a chapter in explanation of some of the signs generally used in chemistry, together with symbols used in art.

Most people are aware that the mysterious signs seen on the big starboard light bottles in chemists' windows are more or less relics and memorials of the chemistry of the middle ages and the peculiar system of alchemy "which was veiled in allegory and illustrated by signs and symbols," but many may not know the signs and abbreviations used in formulæ. Formula in *chemistry* is an expression denoting the composition of a substance, in *medicine*, a prescription, or directions for making up medicines. For instance, ℞ means

recipe or statement of ingredients, formula, prescription, etc.

F. or ft. In a formula these letters are abbreviations of *fiat* or *fiant*, let it or them be made; thus *f. solutio*, let the substance or substances prescribed be made into a solution or liquor. A capital S. represents *signatura* or the label to be put on the bottle.

Some signs, abbreviations, etc., used in formulæ :—

C *or* Cong. Congius. Imperial Gallon.
O Octarius. Pint, of 20 fluid ounces.
lb Libra. Apothecaries', or Troy Pound.
℥ Uncia. Troy Ounce.
f℥ Fluiduncia. Fluid Ounce.
ʒ Drachma. Drachm (60 grains).
fʒ Fluidrachma. Fluid Drachm (60 minims).
℈ Scrupulus. Scruple (20 grains).
♏ Minimum. Minim (1-60th of fʒj).
gr. Granum, or grana. Grain, or grains.
ss. Semis. A half.
Sesqui. One and a half.
q.p. Quantum placet. As much as you please.
q.s. Quantum sufficit. As much as is sufficient.
p.æq. Partes Æquales. Equal parts.
Aa, Ana, *and* Sing. Of each ingredient.

M. Misce. Mix.
S.A. Secundum Artem. According to art.
O.M. Old Wine measure.
Co. *or* Comp. Compound.
Av. Avoirdupois weight.
Imp. Imperial measure.
Pulv. *or* p. Pulvis. Powder.
Sp. Gr. Specific gravity.
d. water. Distilled water.

This chapter is concerned more with signs, symbols, etc., but before going further the following list of the chemical substances used in the arts may as well be given here.

Common Names.	Chemical Names.
Aqua Fortis . .	Nitric Acid.
Aqua Regia . .	Nitro-Muriatic Acid.
Blue Vitriol. . .	Sulphate of Copper.
Cream of Tartar .	Bitartrate Potassium.
Calomel . . .	Chloride of Mercury.
Chalk	Carbonate Calcium.
Salt of Tartar . .	Carbonate of Potassa.
Caustic Potassa .	Hydrate Potassium.
Chloroform . .	Chloride of Gormyle.
Common Salt . .	Chloride of Sodium.
Corrosive Sublimate	Bichloride of Mercury.
Glucose . . .	Grape Sugar.

Common Names.	Chemical Names.
King's Yellow . .	Sulphide of Arsenic.
Lime	Oxide of Calcium.
Lunar Caustic . .	Nitrate of Silver.
Muriate of Lime .	Chloride of Calcium.
Nitre of Saltpetre .	Nitrate of Potash.
Oil of Vitriol . .	Sulphuric Acid.
Potash	Oxide of Potassium.
Realgar	Sulphide of Arsenic.
Sal-ammoniac . .	Chloride of Ammonium.
Slaked Lime . .	Hydrate Calcium.
Soda	Oxide of Sodium.
Spirits of Hartshorn	Ammonia.
Spirit of Salt . .	Hydrochloric or Muriatic Acid.
Stucco, or Plaster of Paris . . .	Sulphate of Lime.
Sugar of Lead . .	Acetate of Lead.
Verdigris . . .	Basic Acetate of Copper.
Vermilion . . .	Sulphide of Mercury.
Vinegar	Acetic Acid (Diluted).
Volatile Alkali . .	Ammonia.
Water	Oxide of Hydrogen.

CHAPTER XII

SYMBOLISM IN ART

A SYMBOL is the representation of some religious dogma as the Creed, the sum of the Christian belief, a sign to know one by, as the bond of intercommunion and test of fellowship and brotherhood among the elect; that secret, private, and mystical note by which they recognised each other when it was not as yet committed to writing, and restricted to the initiated. Whereas an emblem is an arbitrary representation of an idea of human invention, and created by the imagination, a symbol may be used as an emblem, but an emblem cannot be employed as a symbol. For instance, a sword is the symbol of martyrdom, but the peculiar emblem of St. Paul. An anchor may be either a symbol or an emblem.

The earliest symbols were derived from Scripture: the Good Shepherd, disused between the seventh and ninth centuries; the chased hart desiring the water brooks; the

anchor of the soul; and, later, the lamb standing on the mountain of God's house, or, after the sixth century, bearing on its shoulders the cross-banner. The early Christian artists saw the cross prefigured in the outstretched arms of Moses on the hill and in his rod, which they delineated crowned with a T or cross.

Then hieroglyphs were employed. St. Anthony appears with fire, the emblem of Divine love, a swine at his feet, typical of sensual desire trodden down; and a bell expressive of vigilance, and with the Tau, a form of cross. St. Christopher, by his height, represents loftiness of heart; by his sacred infant-burden, Christ in the soul, by his staff holding to the cross and by wading through a stormy river passage to the better country through martyrdom. St. George, armed as the Christian warrior and on horseback, transfixes with his lance the devil. Constantine pourtrayed in the Palatine, a knight with a cross on his helmet, warring with the dragon of idolatry.

A knowledge of symbolism is both interesting and instructive, particularly in the study of early Christian art, and *by it we may often be able to recognise certain figures in mutilated pictures* or ancient monuments, stained glass,

etc., for the use of emblems is as old as the Sphinx and the Pyramids, and the early Christians probably copied or plagiarised many of the Egyptian signs and symbols, under which the truths of Christianity were veiled from the heathen and their use continued to the present day.

Many particular emblems have been so generally and universally used as to have been interwoven and become almost part and parcel of our daily life. Amongst the most venerable may be mentioned the trine compas (as it is called by Chaucer),

> " That of the trine compas Lord and gide is,"

or a circle inscribed with an equilateral triangle, denoting the co-equality and co-eternity of the three Divine persons.

The Egyptian Triad was represented by a globe, a serpent, and a wing which appear on the front of all temples. The globe was an emblem of the Great Architect of the Universe, because his centre is everywhere and his circumference immeasurable. The serpent designates eternity and likewise wisdom. The wing was the symbol of air, or the spirit. On a monument at Thebes, the globe is coloured

red, the two serpents are golden, and the wings red and azured; the intervals between the two serpents is filled by a green tint. The red being the symbol of the love divine, the gold or golden yellow indicates the word Revelation; the azure the air, or divine breath; the green was the last divine sphere, which is again found in the emerald rainbow of the Apocalypse.

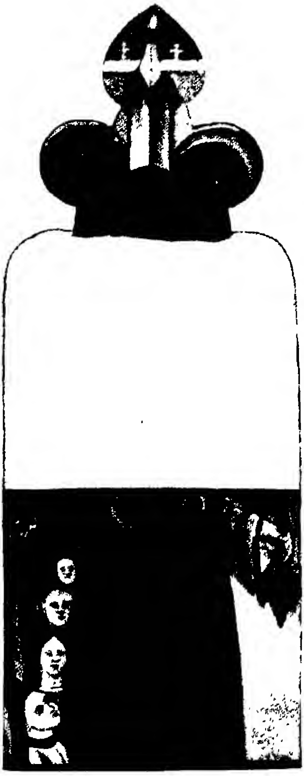
Whatever established prejudices may be, I ought here to repeat the opinion of a savant offered merely as a conjecture, but which here acquires a high degree of certainty: "It is Iso, it is the Saviour of the World and Son of Justice, that the Egyptians figured on all the porchways or entrances of their temples; and the signification of this symbol was therefore that which Malachi has transmitted (ch. iv., verse 2), 'Unto you that fear my name shall the sun of Righteousness arise with healing in his wings.'"

This approximation will doubtless appear strange to those who forget that the Messiah is called by the Fathers of the Church the sun and the good serpent; that the Holy Ghost descended on the anointed of the Lord in the form of a dove; and finally, that the globe, the serpent, and the wings have precisely the

same signification on monuments of the middle ages as on the temples of Thebes.

On entering Winchester Cathedral the eye wanders along the long-drawn nave to the great window which is still glowing with the richest colouring, notwithstanding the mutilation of iconoclastic violence and later restoration with painted fragments from other windows. Here are portions of two very mutilated windows in the north aisle of the choir. They are interesting as showing how a knowledge of symbolism may be of use. Fig. 1, by carrying a sword, indicates that it is St. Lucy. Now suppose that the top of the sword-blade had disappeared, also the pommel, leaving only the centre of the blade, which might be mistaken for a taper, but this would still indicate St. Lucy; again suppose all the sword had gone except the hilt, which might be taken for a platter. Now the problem then would be, what should be painted in to make the picture complete and right? If a dish were painted with two eyes on it it would indicate the figure was that of St. Lucy, if a taper in the outstretched hand or a sword it would still be correct as St. Lucy, for all these things are emblems of her.

Fig. 2 is known by the arrows to be that of



ST. URSULA

ST. LUCY

St. Ursula. Ursula was a British princess, and, as the legend says, was going to France with her virgin train, but was driven by adverse winds to Cologne, where she and her companions were martyred by the Huns. In her delightful volume " Genius Loci " Vernon Lee says that " Cologne, thanks to the great numbers of St. Ursula's maids of honour, had the luck of getting very many relics all at once; and particularly one feels it after a visit to the Treasury of St. Ursula's Church, a vaulted chapel, whose upper part is, very literally, *thatched* vertically and horizontally with canonised bones in elaborate pattern."

The emblems on ancient and mediæval tombs included badges of sex or profession; the comb, keys, shears for women; and for men the sword, the horn, the moneyer's scales, the priest's chalice and paten. The still earlier emblems were numerous. Heaven was represented by a segment of a circle edged with a rainbow, and to symbolise God with the Creator's hand issuing from it or a cloud. A deep blue globe stood for the universe; a ring for eternity; the rose of Sharon for incorruption; a cock for vigilance, a horse for the Christian race; a dolphin for zeal in doing

good ; the pelican " in its piety " has a crimson stain on its beak, supposed to be caused by feeding its young with its blood.

Turning from the sacred to things secular and mundane in the use of emblems it is nevertheless curious to note that " a wine barrel, composed of many staves," was the sign of Christian union. Athenæus and other Greek and Roman writers present numerous instances of the general use of signs by the tavern keeper ; in accordance with the line in the ancient epigrammist :—

" He hung th' instructive symbol o'er his door."

In England, signs appear to have been adopted at a very early period. A discerning eye may discover in many of our signs evident marks of the religion prevalent among us before the Reformation.

Pepys in his Diary frequently mentions the " Herculës Pillars " as a tavern to which he and his friends resorted. This sign has nothing to do with the pillars torn asunder by Hercules, but indicates the two brazen pillars set up by Solomon at the entrance of his Temple, which every Freemason knows are the emblems of strength and stability. Publicans were not,

however, the only persons who indicated their dwellings by signs, for it is shown by every kind of record extant that all other callings and trades adopted similar indications, and that notoriety was obtained by an infinite diversity of pictorial symbols from the artists who dwelt in Harp Alley, Shoe Lane.

Signs were at length deemed a public nuisance, and the law in 1764 caused their removal, and the houses consequently began to be numbered, New Burlington Street being the first to be so distinguished.

CHAPTER XIII

INDIAN INK: ITS MANUFACTURE, USES, AND HOW TO CLEAN DRAWINGS MADE WITH IT

THE Chinese historians attribute the invention of ink to Tien-Tchen, who is supposed to have flourished about 2,600 years B.C. At this time, we are told, the ink used by the Chinese was a kind of lacquer (urushi). Afterwards, some kind of black stone to which water had been added was employed, and finally, about two centuries and a half before the Christian era, in the province of Kiang-Si, they began to make balls of lamp-black, obtained by burning a mixture of lacquer, wood, and size. The new ink was quickly adopted, and not only did poets celebrate the qualities of the ink of Kiang-Si, but the province had the satisfaction of having its industry supervised by an official of the Imperial Court, and of sending an annual tribute of ink for the special use of the emperors of the Tang dynasty. Towards the end of the sway of that family lived an inkmaker whose

name, Li-Ting-Kouei, is still remembered after the lapse of so many centuries. He was not only famous for the diverse forms into which he moulded his cakes or sticks of ink, but also for the honesty and excellence of his manufactures. The indirect services he rendered to literature and learning were acknowledged in an Imperial decree, which added an honorary syllable to his name. Li-Ting-Kouei is the most famous maker of ink, and though many have emulated, it is held that none have surpassed him.

For the production of the lamp-black of Indian ink various methods have been employed, but firwood has generally been used in combination with various oily substances. The best ink is very intense in colour, is about as deep a black as it is possible to get, and has an aromatic scent and flavour. It is believed that the Chinese are indebted to the Coreans for the processes now used, and that Corea is the real birthplace of ink manufacture.

Maurice Jametal in a monograph upon the Indian or rather Chinese ink, in addition to historical data, gives the practical details of the art set out in an elementary treatise by Chen-ki-Souen. This book is one of a kind very rare

in the literature of China, whose writers as a rule have a profound contempt for all that is practical.

We need not follow the worthy author through the details. Fortunately, he has not trusted entirely to his own powers of exposition, and the artist whose help he has invoked has, in a series of quaint drawings, given us some interesting glimpses into the industrial life of the Middle Kingdom.

The Pantheon of China is so well stocked that no surprise need be felt at the presence in it of demigods whose functions are to guard and preserve the various instruments of writing. The God of Ink was known as the "Prefect of the Black Perfume," and had precedence over the Spirit of the Pencil, who had, indeed, only the rank of a sub-prefect, and also over the Genius of Paper, who merely ranked as the Chief of a District. One day, says a quaint legend, an Emperor of the Tang dynasty was at work in his study, when suddenly, from a stick of ink that lay upon his table, there stepped forth the figure, no bigger than a fly, of a Taouist priest. "I am the Spirit of the Ink," he said; "my title is the Ambassador of the Black Fir, and I am come to announce that

henceforth, whenever one truly endowed with learning or genius writes, there shall be visible the Twelve Divinities of Ink."

Indian ink is used in China and Japan with a brush, both for writing and for painting. It is used in Europe for designs in black and white, in which it possesses the advantage of affording various depths and gradation of shade according to the degree of dilution with water.

Black is a very valuable colour in producing effects which please by their surprise, and is most useful in toning down warm colours. The ancient Egyptian and Greek artists were particularly alive to the importance of this colour, and composed their blacks from the best charcoal of burnt vine-twigs.

In more modern times the work of the Japanese particularly calls our attention to the value of this colour in their methods of ringing the changes in black from its deep luminous tones to pleasing and softest tones of grey.

As occasionally one may be requested to clean and restore a monochrome of Varley or Prout, or an architectural drawing, I will give a few hints in this chapter as to the method of procedure. Architectural drawings are not generally very difficult to clean, because as a

rule architectural draughtsmen first of all draw their designs in pencil on strong Whatman paper; they are then inked in with a strong deep Indian ink. After this has been done, and before proceeding to colour, the whole drawing is washed with a sponge and clean water. When the drawing is almost dry it is tinted with flat washes of colour in the ordinary way; therefore, the whole drawing is first of all rubbed all over with a piece of soft white india rubber to remove the surface dirt to which architectural drawings are very liable from handling while they are being referred to by builders. After the surface dirt has been removed, a weak bath of chloride of lime followed by a thorough rinsing is almost all that is required. Should the colours be lowered or weakened by the bath, they may be strengthened by a slight wash of water-colour before the paper gets quite dry; this will tone the colours into the drawing.

With a Varley or Prout drawing it is a different matter entirely, and one should proceed very carefully. In the first place some artists do not use Indian ink when making black and white drawings, but prefer ivory-black for its full, silky black, and as this colour has a tendency to

brown in its pale washes, some are in the habit of adding other colours to correct this tendency. Now as ivory-black is made by charring ivory it is chemically speaking animal charcoal, and had better not be brought into contact with organic pigments, because of the powerful discolourising action of animal charcoal. Gum water is frequently added to retard this action and to strengthen the depth of the black. When this is the case with a drawing, the process of cleaning it is sure to lower the general tone by dissolving the gum that has been mixed with the black. One can nearly always see at a glance if gum has been used, but if there is any doubt a test should be made on one of the bottom corners of the drawing by touching it gently with a large camel-hair or sable brush half full of water. If the black does not yield or come away, one can proceed to clean the drawing in comparative safety. If, however, gum water has been freely used it is better not to take any risk by cleaning.

Ivory-black is perfectly durable if used by itself, but it must be used entirely by itself from start to finish of a drawing for the latter to stand cleaning and restoration.

When cleaning a "black and white" or

monochrome drawing proceed as follows. If the drawing is mounted on a cardboard of what is termed six-or-eight-sheet, split four or more of these layers off by carefully inserting a paper knife between the layers till there are only one or two layers left. By doing this the work of unmounting the drawings is rendered safer and easier. When this has been done, the back of what remains of the mount is then held up close to the spout of a kettle of water kept boiling on a gas ring. Gradually, by going all over the back, the steam will permeate the cardboard and allow the drawing to be pulled off quite easily. Do not use any force. If the drawing does not leave the mount easily continue the steaming process till it does.

Having removed the drawing, lay it face downwards on a clean sheet of blotting-paper placed on a sheet of plate glass. With a sponge remove all trace of paste, gum, glue, or whatever mountant has been used, and the drawing is then ready for cleaning. Remove the blotting-paper and lay the drawing face downwards on the glass and flood with water, tilting the glass so that the water may drain off. Have a solution of chloride of lime ready, and with a full brush go all over the back of the drawing, taking care

not to let the chloride of lime get on to the front of the drawing. About five to ten minutes should be long enough to remove any stains or blemishes. The back of the drawing is then thoroughly rinsed, and while doing this, the drawing should be kept in contact with the glass by the fingers of the left hand. The drawing is then turned face upwards on the glass, *gently* flushed with water, and after thorough rinsing is allowed to dry flat on the glass. If the process is carried out carefully the drawing will dry bright and clean and without injury.

CHAPTER XIV

CLEANING JAPANESE PRINTS

THE question of the condition of a Japanese print is one of personal taste. Some prefer their prints to remain in a more or less soiled condition because of a certain kind of tone or softness that has occurred through age or exposure. In the case of a very rare or ancient print this is excusable, and I should certainly advise its being left *in statu quo* ; but when ordinary prints become soiled, as so frequently happens, I cannot help thinking that at any rate a slight cleansing is necessary. It is seldom that one sees, except in some noted collection, prints with the colours unchanged and the paper in immaculate condition ; on the contrary, as far as my experience goes, the ordinary print that one picks up is generally injured either by fading of the colours, worm-holes, tears, creases, stains, and dirt.

As regards faded colours and worm-holes,

CHOZAN OF CHOJI-YA, ATTENDED BY HER TWO KAMURO. BY KIYONAGA THE JAPANESE THEATRICAL POSTER ARTIST

Specimen of drawing

not much can be done. In some prints of Harunobu, Hiroshige, and Kiyonaga, the blues, whites, and delicate pinks have changed colour, and in others they have vanished altogether. This is no doubt owing to the fact that many of the colours used by the early artists were most unstable. When the colours have faded from old prints, it is better to leave them and not attempt to colour them in. Later on I will describe how these colours can be slightly improved.

Worm-holes may be made good in the following manner: Take a fragment of paper which matches as nearly as possible that of the print, and with a pair of scissors cut a neat small patch slightly larger than the worm-hole. Lay the print face downwards on a sheet of clean white blotting-paper, and with a camel-hair or sable brush damp the worm-hole spots, then touch the patch of paper with some good paste (rice or starch is the best) and with tweezers lay it over the worm-hole; after covering the whole with a sheet of blotting-paper, press with a slightly warmed flatiron till dry.

Tears, if simple, should have the edges moistened with paste and be treated as above described for worm-holes. If the tears are

awkward and at all complicated, it is best to put a neat patch behind them. Always use blotting-paper, because if it should happen to adhere to the paste while being pressed, it can easily be removed by damping after the repairs have been made. Creases can, if they are small, be got out with a warm iron, but if they are large and bad it is best to damp the whole back of the print and lay it on a wet sheet of glass, then smoothing and pressing over the whole surface of the print with a sheet of blotting-paper till the print is in perfect contact with the glass. The print is then put to dry gradually, when all trace of creases will disappear. As to stains, if these are only slight they will generally yield with a good rinsing. Surface dirt will also go the same way. With deep stains a bleaching is necessary, but it is not advisable to venture upon this process unless one has had considerable experience. A camel-hair brush or mop with some lukewarm water and good yellow soap will generally remove grimed-in dirt. All trace of soap should be thoroughly rinsed away.

General cleaning, I find, is best done as follows: Get a white enamel bath, and a sheet of plate glass slightly smaller than the bath, so

that it can be easily lifted from the bottom of the bath. A photographic developing dish, 24 by 20 in., makes an excellent bath and will take almost all the different sizes of Japanese prints, which are as follows, viz.:—

Surimono.—A print, generally of small size and on thick, soft paper, intended as a festival greeting or memento of some special occasion. It is sent out at the New Year particularly.

Uki-ye, or bird's-eye view pictures, are 9½ by 14¾ in.

Yoko-ye.—The horizontal print, about 10 by 15 in.—the normal full-size landscape sheet.

Chuban.—A vertical print, about 11 by 8 in., is sometimes called the medium-size sheet.

Koban, another vertical print, is slightly smaller than the Chuban.

Oban is about 15 by 10 in. and is the normal full-size upright sheet. It is often mounted as Kakemono.

Hashira-ye is a very tall, narrow print, about 28 by 5 in., used to hang on the wooden pillars of a Japanese house.

Kakemono-ye.—A very tall, wide print, about 28 by 10 in. The Kakemono is usually mounted on a margin of brocade, with an elaborate roller at the bottom. It is hung upon the wall at

certain seasons, and when not in use is rolled up and put away in a box. Owing to this, and its being stored in what is called the "go-down," it is frequently found very rubbed and mildewed.

There are many other terms for Japanese prints, as *Uchiwa-ye*, a print in the shape of a fan, *Nishiki-ye* or brocade picture—this term was first used to describe the brilliant colour-inventions of Harunobu, but is now loosely applied to all polychrome prints. Diptych, triptych, etc., are compositions consisting of two, three, or more sheets.

Beni-ye is a print in which *beni*, a delicate pink, is the chief colour used. The term is generally used to describe two-colour prints which preceded the invention of polychrome printing.

As the paper used in the old Japanese prints is thick, soft, spongy in texture, and of a creamy ivory tone, it is very necessary to be extremely careful in cleaning it. India rubber should never be used in surface cleaning or for the removal of dust. This is best done with a piece of quite new bread or a piece of dough, or with the two worked up together into a kind of ball; go over the whole surface of the print with this in a series of circles. This process is

absolutely harmless to the most delicate print, so it is not a bad plan to subject a print to it before it goes into the bath, as it will remove slight surface markings that the bath will not.

The method of using the bath is as follows : Take the sheet of plate glass and wet it with water, then carefully lay the print fact downwards on the glass and allow the water to flow over the print. While this is going on, wash the back of the print with a large camel-hair brush. Reverse the print and, if necessary, wash the front very gently in the same manner. After this is done, tilt the glass by resting it on one side of the bath, and while holding the print in its place with the thumb and finger of the left hand, hold the rubber tubing from the water tap with the right hand, and let the water flow gently all over the print for a few minutes. After this has been done, let the print drain for another few minutes. Have ready a sheet of clean blotting-paper on which to lay the print after it has drained off the superfluous water. Wipe dry the plate glass and lay upon it a dry sheet of blotting-paper. On this lay the print face downwards, covered with blotting-paper. A piece of cardboard laid on the blotting-paper and a slight weight or pressure over all com-

pletes the process. Before the print is quite dry, any injuries in the way of worm-holes or tears should be attended to in the manner above described.

If the print is badly torn, say in several places, it is better to mount it entirely on a sheet of Japanese paper. Care should be taken in mounting, as Japanese paper stretches considerably when wet. To get a smooth result, the print, together with the mounting paper, should be damped and put between blotting-paper till almost dry. The print is then laid face downwards on a sheet of glass or of blotting-paper and smoothed out quite flat. The mounting paper, after being treated in a similar manner, is pasted smoothly with thin rice or starch paste and laid on the print and pressed with blotting-paper evenly all over by a thick cardboard. Weights are then put on the cardboard and the print is left to dry, with an occasional change of blotting-paper, which will absorb the damp. Before final pressing it is as well to see that no paste has got on to either the back or front of the print. If such is the case, it should be wiped off with a soft piece of sponge kept specially for this purpose.

Japanese prints should never be mounted on

cardboard, *i.e.* stuck down. If they are mounted at all it is usual to tack the top corners with paste and lay them on a cream or slightly tinted card, with a larger margin at the top and bottom than the sides. A glass can then be laid over the whole and bound round with paper. If the paper binding laps over the glass cover about a quarter of an inch—it makes a neat finish; and if a couple of rings, with tape tabs, are glued on the back of the card, the picture can then be hung on the wall even without a frame, and looks quite artistic. The most suitable mouldings for framing Japanese prints are the plain narrow ones.

In conclusion, I cannot do better than quote from one of the best authorities on Japanese prints, viz. Mr. Arthur Davison Ficke, who, in his "Chats on Japanese Prints," cautions the inexperienced against acts of vandalism. "To cut down, colour, or otherwise mutilate a print, is one of those unforgivable offences which often demonstrate conclusively how easy it is for a fool to destroy in five minutes the achievement of a genius's lifetime. One well-known collector, now dead, boiled his Harunobus in paraffin to give them lustre; another painted branches into the pillar prints of Koriusai;

another cut down the size of his Hiroshiges, leaving only those portions that particularly pleased him. If the feelings of later collectors have any potency in heaven, these men are now in hell. Not only is any attempt to improve upon the artist's work a contemptible piece of presumption, but even the mere effort to repair damages inflicted by time may be an unwise venture. Frequently such injuries could be remedied by an expert were it not that someone, with the best intentions in the world, has, out of sheer inexperience, made the injuries irreparable."

If a print comes into the expert's hands untouched, he can, as a rule, successfully restore it; but if the print has been tampered with by ignorant attempts at restoration, he is very greatly handicapped and almost helpless. Tears, stains, abrasions, and chemical decomposition may yield to skilful treatment; but unless one knows with the utmost exactitude what he expects to accomplish and how he intends to proceed at every step, he had best leave the matter strictly alone, or entrust it to other hands.

CHAPTER XV

PARCHMENT AND VELLUM AND SOME MOUNTANTS

PARCHMENT, which consists of the skins of sheep and goats, is used extensively in the printing of etchings, and also in the drawing up of a great variety of deeds and other legal instruments. Parchment is coarser than vellum, which is made from the skins of calves. Vellum is prepared in such a manner as to render it suitable for the writing of illuminated addresses, the covering of books, and other purposes. The qualities of parchment and vellum differ very widely; so much so, that the best parchment is preferable to inferior or even middling vellum. The goodness of each depends partly on the quality of the skins of which they are made, and partly, and indeed in a very high degree, on the care and skill devoted to their manufacture. When the skin is divested of its hair, or wool, it is placed for some time in a lime-pit, and then stretched on a square wooden

frame tightened by pegs. While on the frame, the skin is first scraped on the flesh side with a blunt iron instrument, then wetted with a moist rag covered with pounded chalk, and rubbed well with pumice-stone. After a short pause these operations are repeated, but without chalk. The skin is then turned, and scraped on the hair side only. The flesh side is scraped once more, and again rubbed over with chalk. All this is done by the skinner, who allows the skin to dry on the frame, and then sends it to the parchment-maker, who repeats the operations with a sharper tool, but lays the skin on a special pad instead of stretching it on a frame. I have gone into the details of the manufacture in order to show that damping and stretching is quite natural in the treatment of parchment or vellum.

In mounting a parchment print or etching it is best to immerse it first of all in water. After it has soaked for a few minutes, take it out and lay it straight between two sheets of clean white blotting-paper. When it is almost dry and still supple, lay it on a thick mounting board (the thicker the better) and mark with pencil the four corners thus ┌ on the mounting board. Then take the parchment and lay it face down-

wards on a sheet of plate glass. Then get a slip of glass and lay the glass on the parchment about half an inch from the edge all round. Take a paste-brush and go carefully two or three times over the edges till you are quite sure that you have enough paste on to stick the parchment. Next place the parchment carefully on the mounting board so that the corners tally with those marked in pencil. You can take your time in adjusting the parchment accurately. Now comes one of the most important points in the process, the pressing of the edges thoroughly all round with clean blotting-paper. After this has been done the parchment is laid aside to dry. If, in the various manipulations, the parchment has got finger marks, take a clean sponge and rub them off. While the parchment is drying the mount should be held down tightly at the corners; this is best effected by laying on four weights. There should be two or three pieces of blotting-paper put beneath the weights to prevent any impress. When dry the parchment will be as tight and smooth as a drum. Note—the parchment *must not* be too damp when it is stuck on the mount, otherwise the pull will be too great and probably tear away the mount.

As regards the mounting of vellum, the process is somewhat different. The *front* must not be damped. It should be laid, the prepared side down, on a sheet of blotting-paper. With a clean sponge, the back of the vellum is damped thoroughly. If the vellum is of a small size it is best to use for a mount a new, cheap drawing board, slightly smaller than the vellum. While the vellum is damp it is laid on the drawing board and the overlapping sides and top and bottom are tacked with small copper or brass tacks in the way one would tack a canvas for oil painting. Make sure that there are no puckers at the corners. If any occur they should be smoothed out with the blotting-paper before being tacked. Always start tacking from the middle and put one or two drawing pins first of all in the middle of the sides and top and bottom so as to fix the vellum exactly in its place.

In a former chapter I gave a method for making paste from flour, but it is well to know some of the allies and surrogates of flour and their use as mountants. Let me now revert to mountants generally. Glue is frequently used as a mountant, but for several reasons I do not think its use advisable. In the first place

it is frequently contaminated by carrion flies, hairs, etc., and secondly, if exposed to warmth and moisture, it is liable to mildew, as are also the pictures or prints to which it has been applied. Glue frequently cracks, on account of the dryness of the air, in rooms warmed by stoves. The addition of a little chloride of calcium to the glue will, however, prevent this.

While on the subject of glue let me call attention to some of its properties. Dry glue steeped in cold water absorbs different quantities of water according to the quality of the glue, while the proportion of the water so absorbed may be used as a test of the quality of the glue. From careful experiments with dry glue immersed for twenty-four hours in water at 60° Fahr., and thereby transformed into a jelly, it was found that the finest ordinary glue or that made from white bones absorbs twelve times its weight of water in twenty-four hours; from dark bones the glue absorbs nine times its weight of water; while the ordinary glue made from animal refuse absorbs but from three to five times its weight of water.

The best way to make glue is to break it up into small pieces and let them soak for six

hours in cold water. Cover the pieces with water and when they are thoroughly softened, pour off any water that may not have been soaked up by the glue and then transfer the pieces to the glue-pot, stirring them while they are melting over the fire. When thoroughly dissolved stir in a few drops of oil of cloves, and your glue will be ready for use. While in use glue should always be kept hot by a gas ring on the bench. The hotter the glue is, the thinner the coating needed and the better the joint. A good stiff hog-hair brush should be used for applying the glue as quickly as possible to both surfaces. It is a mistake to put glue away for future use with the brush stuck in it. Continual stewing destroys the quality of the glue and spoils the brush. If there is any glue left over in the pot after a job has been finished, the glue-pot should be filled up to the brim with cold water so that the brush may be kept clean and supple. It is a little more trouble, but freshly made glue is always stronger and works in more cleanly fashion than stale which has been left in the pot. Liquid glues are made in great variety, to save the trouble of heating before use, but none of them is so effective as ordinary fresh-made glue.

For all ordinary mounting work *fine* white flour paste is undoubtedly the best. Rye flour makes a very tenacious paste, but is only suitable for the very roughest work and should certainly not be used for any fine art work, as it attracts book worms perhaps more than any other paste. It is made in a manner somewhat similar to ordinary paste, but should have more boiling. This is, however, a very messy operation, and if it must be used, far better to obtain it ready made from any dealer in shoemakers' materials. It will not keep long, as it ferments very rapidly.

Some people imagine that greater adhesiveness is imparted to a paste by adding foreign matters to it, such, for instance, as caustic alkali to starch. It may be as well to point out in passing that it is not advisable to add anything to a paste (excepting a preservative) as the purer it is kept the better for the print, whether of a photograph, etching, or engraving.

For many reasons I am inclined to think that the less paste used in mounting of any kind the better, but " that's another story," which I will explain in the proper place.

Rice makes an excellent paste, indeed I am not sure that it is not superior to all other pastes.

Its adhesive property is rather stronger than flour paste, and it is ever so much better for mounting either a fine India or a Japanese paper.

Arrowroot, the pith or starch of the root *maranta arundinacea*, received its common English name from the use to which the American Indians applied the roots of a plant once confounded with the maranta but now called *Alpinia galanga*, as an antidote to the effect of poisoned arrows. The powder is prepared from roots of a year old. It is often adulterated with the starch or flour of potatoes. It is therefore best to procure it from a good chemist. A paste of the finest quality may be made from it and the method of preparing it is very similar to that of starch.

Starch and gelatine form another mixture recommended by the "Amateur Photographer." It combines the strong adhesive properties of gelatine with the convenience of a mountant which can be used cold. An excellent formula is that of Mr. Ethelbert Henry.

Bermuda arrowroot	8 ozs.
Nelson's No. 1 gelatine . . .	6 drams
Cold water	68 ozs.

Mix the arrowroot in about 4 ounces of water and let the gelatine soak in the rest. When the arrowroot is well mixed, free from lumps, and the gelatine swelled, transfer both to an enamelled iron saucepan and boil over a gas stove for five or six minutes. When cool add :—

Methylated spirits	. . .	5 ozs.
Carbolic acid (liquid)	. . .	26 minims

A soft gelatine must be used, or the mountant will be too stiff to use comfortably.

Another good formula is Gower's, which runs as follows. Place two ounces of starch in a basin, and mix up with a small quantity of cold water. Dilute to about a pint. Boil over a gentle fire till the liquid gelatinises, stirring all the time with a wooden spoon. While quite hot, add one ounce of glycerine and about six minims or drops of oil of cloves, and then pour the mixture into a jar to cool. When nearly cold, stir in gradually one ounce of methylated spirit, and mix very thoroughly. If made in this way the paste will keep indefinitely. Starch and gum make a very good mountant, with greater adhesive power than starch alone, and is suitable for mounting photographs on thick

papers. A standard formula (Valenta's) can be recommended :—

Best gum arabic	2 parts
Distilled water	6 parts

Soak until the gum is thoroughly dissolved and then strain through a very fine muslin to get rid of any grit or impurities in the gum, and add to starch, two parts, previously made into a paste with a little water. Mix well and thoroughly, and heat the mixture by putting the jar into a saucepan of water and retaining it there until it boils or until the starch gelatinises. When cool, add thymol dissolved in a little alcohol, in the proportion of two grains per ounce weight of the mixture.

Dextrine is a modification of starch procured by boiling common starch in diluted sulphuric acid and also in some other acids; by this treatment the starch soon loses its consistence and becomes thin and limpid, being converted into dextrine. It is the best mountant for photographs because of its great adhesiveness, and it does not cockle the mount or penetrate the photograph so much as many other mountants. Higgins's "photo-mounter" is said to be a dextrine preparation, made according to

the patent specification (No. 17,337, 1891), by dissolving dextrine quickly in water at 150° to 160° Fahr., in the proportion of five pounds per gallon, cooling quickly to 40° Fahr., filling into jars, and allowing to stand in a cool place for several days or weeks, until the contents assume a white, pasty form.

CHAPTER XVI

PHOTOGRAPHING PICTURES

TO copy paintings, etc., properly it is first of all necessary to have an absolutely firm, solid, and easily adjusted copying stand. A very handy one can be made by getting two 3-in. square lengths of hard wood; these are connected by several battens. Lengths of iron ⊥ pieces are then screwed on to the hard wood so as to form a kind of tramway. Two uprights are then fitted into two runners to form a sort of upright easel. On the bottom of each runner a pair of sash wheels are let in almost flush so that they will run smoothly along the tramway. A carrier is then made in a somewhat similar manner for the camera. This carrier should be just so high that when the camera is on it the lens points to the centre of the board of the upright easel. By this simple apparatus very much time and trouble is saved in focussing; indeed, without some such arrangement it is

impossible to avoid distortion of the subject by failing to secure parallelism.

If, however, one only occasionally has copying to do, a ready method of quickly adjusting a picture and the ground-glass screen to parallelism is a matter of importance when copying is to be undertaken with ordinary apparatus not specially fitted for ensuring proper adjustment. Against the bottom edge of the board upon which the original is fastened, a magnetic compass is held, the compass being in a square case; the reading having been taken, the compass is then similarly placed in relation to the focussing screen, and this latter is shifted until a similar reading is obtained. The horizontal adjustment having been made as described, the plumb line is used to secure the vertical correspondence.

When the attempt is made to obtain copies of valuable and old oil paintings with ordinary plates the results are generally disappointing, but by using a chromatic plate in conjunction with a colour screen pleasing and satisfactory copies can be made. As regards the lens any good rectilinear is suitable, and F/16 or F/22 are good working apertures. If possible always use a yellow screen in copying oil paintings. The

main purpose of the yellow screen is to obviate the intense reflections from parts of the varnish. I have always found a better result when a light screen is used than without the same. On the other hand, though there may not be much actual blue in a picture, there may be greens and greenish blues, which reflect a lot of blue light, and if these are accompanied by deep browns and reds, the screen would dampen the action of the blues and greens, and give the browns and reds more time to act. If it is a very old and dark coloured picture, always use a deep yellow screen, giving a long exposure with it, then remove screen and give a short exposure, which allows any greens and blues to act.

The larger one makes the image in copying the longer exposure must one give the same stop. To make this clear, let us take an example. A lens is used on a landscape, the stop employed being F/8. The focus of the lens, let us say, is eight inches. The distance of the ground-glass screen from the lens will be about eight inches for all ordinary outdoor work; the nearer the object the greater this distance, it is true, and with some pictures it may be nine, or even ten inches. Still, so far as the exposure is concerned, we may regard it as still being eight

inches, although in these latter cases we are in reality using the lens at F/9 or F/10, and to be strictly accurate we should alter the exposure accordingly. However, as already remarked, it is not material. When we come to copying, however, this difference grows so marked that we are bound to take it into consideration. In copying a print the same size, for example, the distance with the 8-in. lens we have supposed to be in use would be sixteen inches (twice its focal length), and its stop marked F/8 is no longer F/8 but F/16. Four times the exposure requisite with a true F/8 is therefore necessary. Similarly, when copying to get an image six times the size of the original (linear), the distance of the focussing screen from the lens is, approximately, fifty-six inches with an 8-in. lens, and our stop F/8 has become F/56. As F/56 requires just forty-nine times the exposure that F/8 demands, we should have to give under such circumstances forty-nine times as long as with a true F/8.

It is important to find the correct exposure, which may be from five to ten seconds under some conditions or from one to sixty minutes under others; so much depends on the light, lens, stop, and the plate used. For instance,

suppose one wished to copy an engraving by day in a fairly well-lighted room, with a rapid rectilinear lens, using an F/16 stop and a process plate, the exposure necessary would be from seven to ten seconds, with an ordinary plate about five seconds. Again, supposing one was copying an old and yellow engraving illuminated by one incandescent gas light at a distance of twenty inches. Using F/16 stop and, say, an Ilford chromatic plate, the correct exposure would be five minutes. Under the same conditions, but removing the engraving five feet from the gas light, the exposure needed would be thirty minutes.

As I have just said, to make a copy of an engraving or drawing, the same size as the original, the lens must be double its focal length from the engraving and also from the plate. That is to say, if an 8-in. lens be used, the camera must be racked out to sixteen inches and the print to be copied must be placed sixteen inches in front of the lens.

When a camera and lens are not available there is another way of making a full-sized copy of an engraving (if a reversed copy is immaterial), that is to expose *through* the print in contact with a sheet of bromide paper, giving

about $2\frac{1}{2}$ times the normal exposure required, and developing up until the image is nearly buried, and reduce the developed image with persulphate of ammonia, subsequently re-developing in daylight, when a reversed positive print results.

The following is a good developer, and particularly suitable for negatives in black and white :—

No. 1.

Hydroquinone	80 gr.
Sodium sulphite	1 oz.
Water to make up to . . .	10 ozs.

No. 2.

Potassium carbonate . . .	$\frac{1}{2}$ oz.
Potassium bromide . . .	10 gr.
Water to make up to . . .	10 ozs.

Mix equal parts of Nos. 1 and 2. Negatives so made will yield deep black and pure margins if printed on *smooth slow* bromide paper. These bromide prints may be developed with the hydroquinone-potash given above for the plates, but diluted with an equal quantity of water. Development should not be continued too long, three or four minutes is usually sufficient to

obtain all needful contrast; prolonging development will only produce harsh results or fog. If the exposure proves to have been too short don't mess about trying to improve your negative, but save time by taking another photograph. Don't have too much light when developing, but do with as little as you can where chromatic plates are concerned. You will not improve your negative by looking at it every few seconds to see how it is getting on. If your exposure has been right you can almost develop your negative in complete darkness by using a normal developer and developing for a given time.

In copying engravings, etc., I generally lay them on a sheet of plate glass, and after thoroughly damping them press with clean blotting-paper into contact with the plate glass; by doing this one gets a perfectly flat surface, and at the same time removes any slight irregularity of surface or creases that may be in the print. The glass is then stood on end for the print to dry, the photograph being taken just before the print is quite dry. When copying lead-pencil drawings it will be found that they will appear brighter in the negative and blacker in the photograph if the drawing

is damped before making the exposure. In cases where it is not possible to damp the print, clamp a sheet of plate glass against the engraving or drawing to keep it flat. Should the paper be thin and show lettering or other dark marking through to the front, this may be minimised by placing a sheet of black paper against the back of the print when copying it.

When a drawing or print is mounted or has printed matter on the back it may be copied by the method known as Playertype, as follows. Suppose the object to be copied is a pencil drawing mounted on a sheet of cardboard. First lay on the table some solid, firm object having a *flat* surface, *e.g.*, sheet of metal, drawing board, plate glass. Next comes the mounted drawing card downwards, drawing face upwards. Then a piece of *slow* bromide paper. This is placed film downwards, so that the film is in contact with the pencil drawing. On the back of the bromide paper is laid a sheet of plate glass, so as to press the bromide paper into good and even contact with the drawing and keep all flat. On the top of the clear glass is placed a sheet of green glass. Now, at a distance of about fifteen inches to eighteen inches over the middle of the pile, is

arranged a No. 5 Heron's gas burner. The exposure is about five to ten minutes. Thus the light from the gas-jet passes through the green glass, the sheet of plate glass, the bromide paper, the film, and on to the surface of the drawing. On development the parts of the sensitive film in contact with *white* paper of the *drawing* develop black, while the parts in contact with the black marks of the drawing are left white. Thus from the positive (drawing) we get a contact negative. This is developed, fixed, washed, and dried in the usual way, and from it by contact a copy positive is made.

The developer used by Mr. Player is as follows :—

Hydroquinone	2 gr.
Soda sulphite	4 gr.
Pot. hydrate	2¼ gr.
Pot. bromide	2 gr.
Water	1 oz.

Copies of pencil drawings and engravings made by this method are particularly fine; the process has not met with the notice and appreciation that it undoubtedly deserves.

Framed pictures under glass may be copied without removing the glass, if necessary, but

care must be taken to clean the glass first and avoid reflections, which the glass is almost sure to throw. Photographing framed pictures should be done by daylight, and the picture shaded in some way, so as to neutralise reflections. Personally I use collapsible square box-shaped screens, with the four sides covered in tissue paper. In copying any subjects with glossy surfaces one should use a yellow screen, for light reflected from glossy surfaces, though insufficient to be strongly perceptible to the eye, nevertheless exercises a marked effect upon the sensitive photographic plate. A screen is easily adjusted to the lens and the cost is but a trifle.

CHAPTER XVII

PICTURE FAKING AND PICTURE FAKERS

A COPY is a reproduction of a work by another hand than the original. If a master copies his own picture we call it a *replica*, which the French designate by the term *doublette*. Copies are of three kinds. The most general are those in which the copyist imitates the original with exactitude; in this case the difficulty of copying is but slight. The second kind is where the copyist avoids exact imitation, but renders the original freely in its principal traits. These copies, imitations in style and colouring, are soon seen to be sham or false pictures. The third and most important kind of copy is that in which the picture is imitated with the freedom of a skilful hand, but at the same time with a truthful feeling of the original, and with the inspiration of genius, finding satisfaction, not in copying, but in an imitation little short of creation.

The first kind of copies are those which people of taste going to Italy bring home with them; they are very often beautiful copies of beautiful originals, and do not assume to be anything but what they are, *i.e.* copies of genuine, recognised *chefs d'œuvres.*

The second, being counterfeits or spurious, are generally described by the expressive and comprehensive slang term of *fakes.*

While in the third we may class the works of Michel Angelo, Raphael Sanzio, etc.

On the revival of painting in Italy, Michel Angelo and Raphael in composition and design, Titian and Correggio in colouring and light and shade, unrestricted to the practice and unoppressed by the reputation of their predecessors, arose to a degree of excellence in which they have never been equalled, although they have been persistently imitated. All small or large oil pictures shown as Michel Angelo's are copies from his designs, or cartoons, by Marcello Venusti, Giacopo da Pantormo, Battista Franco, and Sebastian of Venice.

Oh, Germany, how much to thee we owe,
As heaven-born Pitt can testify below,
Ere cursed confederation made thee France's
And only left us thy d——d debts and dances!
To Germany, what owe we not besides?

Byron might have added *faking*, for Imhoff, a Nuremberg artist of the sixteenth century, turned out the most extraordinary number of faked drawings ever known in the annals of faking. He maintained a band of copyists, all capable of imitating Albert Dürer to perfection. Thanks to them, posterity possesses at least one duplicate of every picture painted by Dürer. As for Dürer's sketches, the forgeries are innumerable. After Imhoff's death, his heirs and descendants carried on the business, among the master-fakers employed there being Gärtner, Bonnacker, Johann Ruprecht, Johann Fischer, etc. "This *posthumous* school of Dürer," says his biographer, Herr Thausing, "has no analogy in the history of art. No other old master—not even Raphael—has been exploited by fakers in so persistent a fashion as Dürer."

There was also a print faker in Hamburg who specialised in tiny prints—some no bigger than a postage stamp—by early engravers, such as Aldegraver, Schongauer, etc. Counterfeits with such a small compass are almost impossible to detect. This Hamburger used to mount his fakes on paper torn from old books, on the back of which he forged the marks of dealers and monograms of collectors through whose hands they were supposed to have passed.

ALBERT DURER, 1471—1528

He was the first who engraved on wood

Specimen of repairing

In France the faked drawings industry is a most flourishing one, the nineteenth-century painters—Prud'hon, Delacroix, Ingres, Corot—being the most favourite victims. The fakers make a point of attending the sales held when a great artist dies. Generally, on these occasions, everything is sold, and they buy for a trifling amount sheets of paper on which the artist has made rough sketches or a few pencil marks. These may not show any regular design, but so long as the paper bears a stamp showing the sale or some evidence whence it came, the fakers are satisfied, for they have something authentic to work upon. Photography is largely utilised by fakers incapable of making even a feeble pencil sketch. Things have moved since the day when Daguerre fixed his pictures on a bit of looking-glass. The camera now enables one to photograph any drawing—coloured or not—so accurately that even an expert can hardly distinguish the original from the copy. Astonishing results are obtained by employing the carbon, platinotype, and other processes. From one end of Paris to the other one hears the same old story, with variations, of collectors being imposed upon with early impressions of the engravings of Ward and Smith—*made in Germany*.

When the Exhibition of Primitives gave a vogue to French painters of the fifteenth century, the armoury of the fakers was enriched with new weapons. They painted upon panels, with a golden background, historical scenes bearing inscriptions in Gothic letters. Fight shy of these Chapters of the Orders of Knighthood, State Entries of Sovereigns, etc. They are too beautiful to be true. The Germans have a way of faking them of such extreme simplicity that one marvels it can deceive anybody. As many of the Flemish Primitives have been chromo-lithographed, these fakers select a chromo of some little-known picture and with weak paste mount it face downwards on a sheet of glass. When dry, the back is rubbed away with pumice powder till there remains of the chromo only a film as thin as tissue paper. This is then soaked off the glass, and while it is still damp is pasted with a strong paste and then mounted on old canvas or panel. A piece of cloth, or several sheets of blotting-paper, are then spread on top of the canvas or panel and put under pressure, and when dry the chromo adheres tightly, showing the grain of the canvas or panel. A coat of size, followed by a coat of thick varnish and a grimy, worm-eaten frame, makes the picture ready for the unwary.

LEYDEN (LUCAS JACOBS, CALLED LUCAS VAN) 1494–1533

Specimen of cleaning and repairing

As regards counterfeit oil paintings, no painter is more easily imitated than Greuze. A talented painter named Abrier flooded the market with pseudo-Greuze under the Second Empire. M. Paul Eudel, the erudite student of counterfeit art, says that although Abrier's original work was held in high esteem, yet he painted little heads à la Greuze on old canvases and mellowed them with the aid of stains, yellow varnishes, and prolonged exposure to the sun. Then he would hang one up in his studio amid his own paintings and wait for the dealer or collector to drop in.

"Hullo! You've got a Greuze?" the victim would say.

"I don't know whether it is or not."

"Oh yes, it's a Greuze. How much?"

Abrier would name a big figure.

"At a price like that it must be a Greuze."

"I'm not so sure. I put a fancy price on the picture because I don't want to part with it. That's all."

Then the victim would depart with the canvas, and Abrier would take another ravishing head by Greuze from a secret cupboard.

At the present time some of the founders of the French modern school are extensively copied and faked—Daubigny, who loved the

Oise and her charming banks; Diaz, the forest painter; Corot the poetic, the mysterious, le Père, the father of them all.

James Webb, the marine painter, spoilt his reputation by copying Constable.

Another famous copyist was Jan Griffier, a landscape and genre painter, who was born at Amsterdam in 1645 and died in London, 1718. Griffier was remarkable for his imitations of Ruysdael, Sachtleven, Rembrandt, Teniers, Elsheimer, Berchem, Lingelbach, Poelenburgh, Wouwerman, Salvator Rosa, and others. Many of these imitations are said to have been purchased as originals even in Griffier's own time, particularly those painted in imitation of Teniers.

The following anecdote of the eighteenth-century picture fakers is recorded by Mr. Noel Desenfans, whose collection is now in the Dulwich Gallery. "Many pictures," says Mr. Desenfans, "have been made to acquire the appearance of age, even to a complete deception; and I remember, at the commencement of my collecting, having purchased some: they were offered at a price which induced me to buy; and as the very canvas on which they were lined, to prevent their falling into decay,

appeared old, whatever uncertainty I might have been in as to their originality, I had not the least doubt as to their antiquity.

" I sent for a picture cleaner, who made use of spirits of wine, and in a moment that which he worked upon was totally ruined, which made the cleaner say, that the pictures had been in the *Westminster* oven.

" He then informed me that there was in Westminster a manufactory where several persons were employed making copies, which, after having been soiled with dirt and varnish, were thrown into an oven built on purpose, and moderately warmed, where in the course of an hour or two they became cracked and acquired the appearance of age and a certain *stoicity* the pictures I had bought did not possess, which made me conclude they had not been baked enough.

" I will venture to assert that many of our superficial connoisseurs have been caught, as I have been, with this snare, and have preferred to the best modern productions those of the Westminster oven."

Since Mr. Desenfans' time, fakers have invented no new methods—the same old canvas on which they make a copy, or better still a

medley, an arm from one picture, a face from another. When dry, they give it a mellow tone with some dark, common varnish or a fine varnish coloured with a suitable glazing colour. The grime of age is simulated by the aid of liquorice juice, and then the picture is baked in the sun or, if speed be necessary, in an oven. Cracks are made with the point of a needle. Some put a metal plate on the canvas and strike it with a hammer. The varnish then becomes covered with stars.

Transformation is another trick of their trade. It consists in substituting a pretty girl's face for that of a wrinkled old woman. Portraits of old ladies are, as a rule, unsaleable and can be picked up cheap in the auction room by the faker. It sometimes happens these old portraits are well painted. The faker's job is then easy : he lowers the high-necked dress, wipes out the wrinkles in the face and hand, and cribs some portrait of Gainsborough, Romney, Kneller, or Lely. Apart from the faker, these painters have herds of copyists, not only in their own time, but at the present day. It is remarkable, but portraits have ever been a favourable subject for the faker as well as the legitimate copyist ; indeed, Hogarth has recorded that portrait

painting was almost the only branch of art that enabled a painter to procure a tolerable living.

Kneller, the German who was adopted by the English, painted nothing but portraits. His practice was to paint the heads and hands of his pictures only; the draperies, ornaments, and backgrounds were put in by English, Dutch, and Flemish artists. It was Sir Godfrey Kneller who established in England this practice of manufacturing portraits, which enabled him and other artists of his time to complete the quantity of portraits that, had they relied on themselves alone, they could not have accomplished.

I have not been able to find a list of the names of Kneller's assistants, but he seems to have been keen in his search for struggling artists, for according to Pilkington, Kneller, on seeing one of William Gandy's portraits and hearing of his obscurity in Exeter, would willingly have patronised him in London; but Gandy's pride was as great as his talents, and he died in a state of poverty.

While Kneller was painting King Charles's starry gentlemen, his rival Lely, another German who had painted a portrait of Charles I., seemed to have turned cat in pan, for after the execution

of Charles he was called to paint that of the Protector, Cromwell, who said to him, "Mr. Lely, I desire you will use all your skill to paint my picture truly like me, and not flatter me at all; but remark all these roughnesses, pimples, warts, and everything as you see me, otherwise I will never pay you a farthing for it." After the Restoration, Lely was appointed State painter to Charles II., who also conferred on him the honour of Knighthood.

Sir Peter Lely's pupils or assistants were as follows, viz.:—

John Greenhill, Henry Tilson, William Wiseing, Prosper Henry Lankrink, John Baptist Gaspars, John Cauder Eyden, Joseph Buckshorn, John Dixon, and Davenport. Pilkington tells us that "Lely's only disciples were Greenhill and Buckshorn; but he appeared so jealous of having a rival in either of them, that he would not permit them to see in what manner he mixed or laid on his colours, nor how he marked and distributed them with his pencil; though each of them copied the works of their master to great perfection."

When we find that such artists had the nobility for their patrons, and, to crown the whole, were appointed painters to the king, it

is not surprising that greater artists turned their attention to copying and portrait painting.

Thomas Gainsborough was from 1760 to 1768 in the flower of his life and professional excellence, and during that period painted a series of his very finest pictures; but they were then so under-valued and so rarely purchased, even at prices which little more than paid for brushes, colours, and canvas, that he would have spent his whole life in neglect and indigence, had he not made his timely escape from painting landscapes and rustic figures and found employment in portrait painting.

Of Gainsborough, Sir Joshua Reynolds said that he could copy Vandyck so exquisitely that at a certain distance he could not distinguish the copy from the original, or the difference between them.

Of Vandyck's imitators and copyists, the following are considered among the best: George Jamesone, styled the Vandyck of Scotland, who studied in the school of Rubens at the same time as Vandyck; Adrian Hanneman, whose copies have been mistaken for originals; James Gandy, a disciple of Vandyck, whom he imitated with success, so much so that several of his copies of that great master,

which were in the Duke of Ormond's collection, were actually sold as original paintings of Vandyck ; and, lastly, John Petitot, who painted several portraits after Vandyck, in which he was guided by the personal instructions of that great master. Vandyck sometimes amused himself with engraving, and etched several plates, consisting mostly of portraits. Some of these have been counterfeited.

FRANCISCVS SNYDERS Pictor

CHAPTER XVIII

PASTELS, CRAYONS, AND CHALKS : METHODS OF CLEANING THEM

PASTEL is the French name for coloured crayons, but there is almost as much difference between crayons and pastels as there is between chalk and cheese; indeed, to a certain extent there is a sort of similarity or resemblance to cheese in a really good old French pastel because of its soft, unctuous feel. These old French pastels do not seem to be made now, for some of the modern versions are far from satisfactory in certain ways. I once had the good fortune to pick up a collection of old French pastels. It was contained in a chest of drawers and consisted of some hundreds of colours ranging from the deepest tints to the lowest tones. There was no hardness or grittiness in these pastels; they were just of the right softness to spend and yield freely without breaking or crumbling, rubbing on and adhering perfectly to the paper.

Chalk is an earthy form of *carbonate of lime*, of an opaque white colour. The application of the microscope to the examination of chalk brings to light the interesting fact that this substance has not had its origin in chemical precipitation, since it contains abundance of the inorganic remains of marine animals and plants, principally the former.

The chief microscopic constituents of chalk are the remains of shells of Foraminifera, spicules of sponges, the valves of the diatomaceæ, and peculiar bodies called crystalloids. The last-named minute and remarkable bodies form the cementing material of chalk. The Foraminifera and similar minute organisms comprised under this title form mountains in the Mediterranean regions, and are so abundant in fossil deposits that not only all chalk cliffs, but even the eternal Pyramids of Egypt may be said to be built of them.

Drawing chalk was originally restricted in its colour to white, black, and red. Latterly drawing chalks of every colour have come into use and are known by the name of *crayons*. *Creta Lævis* is a form of crayon mounted in wood. It is said to be clearer than chalk and have more softness and delicacy. Work done

with either of the above-mentioned crayons has certainly a soft effect, but such softness is as a rule tame and flat. It can hardly be otherwise, seeing that for the most part crayons are made of soft white clay, coloured with various pigments. Although drawings made with crayons are usually termed chalk drawings, that term is not quite correct, because the chalk drawings proper are, strictly speaking, those made in the red substance coloured with the oxide of iron, as used by Bartolozzi, Sir Thomas Lawrence, Watteau, and others, the high lights being put in with white chalk. Lord Leighton, Whistler, and Walter Greaves, the last of whom still survives, used white chalk on brown paper for many of their studies and sketches for pictures, while Daubigny made large and small drawings in chalk and charcoal directly from nature.

Alfred George Stevens, painter, sculptor, and designer, the pupil of Thorwaldsen, and the most thoroughly educated artist the country has seen, made composite studies in red chalk, lead pencil, and water-colours. W. F. Settle, marine painter to the Royal Scottish Yacht Club, made drawings in crayon and water-colours combined.

The French artists have been more successful

in their mode of using pastels than those of any other nation. Some years ago the "Burlington Magazine" gave a particularly interesting account of Jean-Baptiste Perronneau, the pastellist, and examples of his pictures which "will secure his recognition for all time as one of the most eminent masters and the most surprising colourists of the eighteenth century and even of the whole French school."

Many people imagine it is not possible to clean a pastel drawing. It is, I confess, a difficult operation, but by no means impossible. Many years ago I purchased some old and damaged pastel drawings for experimental purposes. They were badly stained by water and had evidently been hanging on a damp wall. As they were poor specimens and undoubtedly copies, they were, comparatively speaking, worthless. The colours were damaged by rubbing and had become very grubby through not having been protected by a glass covering. I had, therefore, no fear of spoiling them. They were drawn on a kind of fine brown sugar paper with a rather rough surface. I don't think they had ever been fixed; at least, I found no trace of a fixative.

The method adopted for cleaning was as

follows. Taking a sheet of strong drawing paper, I laid it on the bottom of an enamelled bath, and almost filling the bath with tepid water, the pastel drawing was then laid on the surface of the water. The reason for doing this was, first of all, to get creases out of the pastel drawing. As soon as the creases had disappeared, the drawing paper at the bottom of the bath was lifted gently in such a way that the pastel drawing adhered. This should be done very carefully in order to prevent the face of the pastel from getting wet. In doing this the tyro will have some difficulty, but it can be surmounted by pinning to the edges of the pastel with drawing pins four thin, narrow strips of cork. The drawing paper, with the pastel still adhering, is then laid on one side while a bath of weak bleaching solution is made up. When this is quite ready, the drawing paper with the pastel is laid on top of the bleaching solution, as above described, still taking care that the face of the pastel does not get wet. A few minutes are allowed to elapse for the bleaching solution to permeate the drawing paper and pastel, after which they are lifted from the bleaching solution. This should be thrown away and the bath quickly filled with

clear water, upon which the drawing paper and pastel are again laid. The drawing-paper support is then gently disengaged from the pastel and allowed to sink to the bottom of the bath. A piece of rubber tubing from the water tap is then inserted beneath the pastel, and water is allowed to flow very gently in at one end of the bath and out at the other till any froth or scum of the bleaching solution has been removed from the bottom of the pastel. When this has been done, the pastel is lifted from the bath and laid on a sheet of plate glass. The back of the pastel is then examined to see that all stains have been removed, after which the pastel is again put on the top of the water for the final rinsing. When this is completed, the bath is tilted so that the water can run away and leave the pastel on the drawing-paper support. Now comes one of the most difficult and important items of the whole process. Hitherto the water has not been allowed to pass over the face of the pastel, but as it is lays flat on the bottom of the bath, water is allowed to flow over or flood the pastel *very gently for a few seconds.* The pastel is then lifted by its support and laid on the work table. In the " drying off " and indeed *throughout the whole process of cleaning*

it is advisable that the front surface of the pastel drawing be not touched by the fingers or blotting-paper. Sheets of clean white blotting-paper are spread out and the pastel finally laid upon them to dry, when it will be ready for any retouching that may be necessary. In retouching, don't attempt to match certain tints by mingling several colours together; it is much the better plan to get the exact tint. To do this it is necessary to procure a colour chart from a pastel maker. By comparing the colour chart with the pastel, the tints needed are easily recognised and their numbers noted. By selecting colours in this way a good working collection is got together and the eye is trained in matching.

Pastel pictures are often said to have too soft and mealy a look, and to be likely to fade as time elapses or moulder by the natural disintegration of the chalk. Part of this statement is perhaps true as regards a slight fading of some of the colours. The mealy look is generally due either to the drawing having been rubbed or to its not having been properly fixed. As regards the fading by time, any fading that may occur is almost an added charm and gives, more or less, a certain mellow-

ness of age, for thus all precious things are dimmed by the years, but nevertheless there is still a lasting loveliness which is always pleasing to the eye. The great, and one might almost say the only, enemy of pastel drawings is damp and mildew, for pastels seem naturally susceptible to damp; but if care is taken to keep them in a dry position in a well-ventilated room, out of the direct rays of sunlight, little or no harm can happen to them, *and there is no need to fix them.*

I am inclined to think that, in some cases at any rate, where mildew has occurred in pastels it is owing to the fact that before making a crayon or pastel drawing some artists give the paper two or three coats of size, and when dry make the drawing. After the drawing is made it is held a slight distance from the spout of a kettle of boiling water, whereupon the size and crayon (or pastel) combine, fixing the drawing. This is not the best method of fixing, for several reasons. In the first place, unless done very carefully, the work will look patchy; and, secondly, if damp gets into the picture, it will act upon the size and start mildew.

There are many fixatives for pastels sold by artists' colourmen. One of the best I have

found is of French preparation, but it has to be applied very carefully with a sprayer or vaporiser. It is not much use attempting the fixing process with the sprayer fitted with a mouthpiece whereby the fixative is blown over the surface of the pastel. Like the kettle process above described, the result is generally patchy. The best method I have found is to procure a barber's sprayer or vaporiser, fitted with a kind of bag-like rubber bellows. With this apparatus a fine and continuous spray can be played all over the pastel. The bottle containing the fixative is held in the left hand, and the rubber bellows manipulated with the right hand, while the pastel stands on the easel. It is very important that the vaporiser be kept quite clean, and directly after use it should be thoroughly cleaned with methylated spirits and a piece of wadding or cotton wool.

At the beginning of this chapter I mentioned that the exceedingly minute shells of the Foraminifera, diatoms, etc., are composed principally of carbonate of lime, and, in consequence, effervesce copiously when a dilute acid is added to them. *Under no circumstances, therefore, should acid be put upon or allowed to come near a pastel drawing, or it will be ruined.*

I mention this fact because acid is sometimes recommended to take out certain stains.

Pastel paper is frequently pasted upon linen before the drawing is made. This is not only unnecessary, but harmful. A good strong suitable paper with a "tooth" or surface to take the pastels is best stretched or drummed on a light wood strainer. When the drawing is finished and fixed it should be covered with patent plate glass bound to the wooden strainer with strips of waterproof paper in the manner of a *passe partout*.

CHAPTER XIX

NEW METHODS OF RESTORING: THE CLEANING AND RESTORATION OF MUSEUM EXHIBITS

MUCH has been said from time to time in the public press concerning the manner in which science can help in the restoration and preservation of prints exhibited in such places as the British Museum, but in the report by Dr. Alexander Scott on new methods of treatment which have been worked out, there is not much that is new.

In this report, issued by His Majesty's Stationery Office, we are told :—

(*a*) " The appearance of brown or other coloured spots all over the paper on which drawings have been made is a constant source of anxiety to those who have the custody of drawings and prints. This anxiety is naturally increased when these have been coloured in any way, especially when the pigments employed are unknown.

(*b*) " In the case of engravings and etchings

in which the basis of the picture is printers' ink or carbon in some form or other, retained in its place by a medium of an oily or greasy nature, the judicious use of bleaching agents which owe their action to oxidising or reducing the colouring matters and stains, may restore the paper to its original tint or render it even whiter than it was originally. To avoid weakening or destruction of the paper the solutions used should be very dilute—say from ½ to 1 per cent. If bleaching powder and hydrochloric acid are used one fluid ounce of the concentrated acid in a quart of water is ample for all ordinary cases, and from a quarter to half an ounce of good bleaching powder to the same quantity of water; the mixture of bleaching powder and water need not be filtered.

(*c*) "The best procedure is to immerse the prints in the hydrochloric acid for 10 to 20 minutes, and, without washing, place them at once in the bleaching-powder solution for an equal length of time; again transfer to the hydrochloric acid without washing. If not thoroughly bleached, repeat until no further improvement is observed, when the prints must be thoroughly washed in ordinary water for some hours.

" A *small* quantity of sodium sulphite may with advantage be added to the water before finishing the washing to remove every trace of free chlorine.

(*d*) " Instead of bleaching powder the so-called ' solution of chlorinated soda ' may be used. This is sometimes too alkaline, and, if so, may render the paper dangerously soft and tender from the solution of the size in the paper."

All the methods recommended in the above report are fully treated and explained earlier in this work. There objection is raised to the use of hydrochloric acid, as daily experience teaches us that there are dangers attached to its use. To take only one instance, for example, the pouring of hydrochloric acid upon an India paper print and then transferring it to the bleaching-powder solution. In doing this the India paper would be almost certain to leave the plate paper, and even if it did not do so the whole surface would be more or less covered with blisters.

The report adds that : (*e*) " the coloured spots are almost invariably due to the growth of mildew and moulds, or similar organisms, the spores of which have been in the paper from the time of its manufacture or which have

settled on the paper from the atmosphere. They germinate and grow, deriving their nutriment chiefly from the materials used as size, such as gelatine and albuminous substances. For this germination and growth of such moulds and bacteria, a high content of water vapour in the atmosphere seems to be an essential condition. Hence it is that drawing papers which have been taken to seaside places or which have been stored in underground railways have shown such marked deterioration. A return to a dry atmosphere in the majority of cases seems enough to arrest the various growths, but until means have been found to kill the spores and the various growths the prints cannot be considered safe. Observations are being made with various preservative and antiseptic agents by means of which it is hoped to destroy the spores and growths, and so preserve the paper and the pictures on it from further injury. Needless to say that solutions of such agents as corrosive sublimate are inadmissible, as being of too dangerous a character for use with delicate colours, but thymol and similar substances, aided by a gentle rise in temperature, seem to promise good results. Formaldehyde (' formalin ')

would no doubt act, but, from its constitution and chemical activity, can hardly come under the category of undoubtedly 'safe' re-agents for this purpose until it has been very carefully tested. From the purely chemical point of view it may easily pass to formic acid, the presence of which may prove dangerous to many colours."

The treatment and removal of mildew, moulds, etc., was gone into at length in a former chapter, but I might note in passing that a bath of distilled water, followed by a weak bath of formalin, after which a thorough washing, would in *the case of a print* or black lead-pencil drawing, remove all trace of mildew and do no harm; on the contrary it would tend to strengthen and restore the texture of the paper and allow of its being pressed with a fairly hot iron. As black lead, plumbago, or graphite, is a species of carbon, and contains traces of iron, silica, and alumina, it is impervious to water, and by submitting it to the action of a hot iron it would acquire greater firmness, and a more brilliant colour or lustre.

The report further states that: (*f*) "In many drawings and coloured pictures of all kinds the white portions are rendered or intensified by

means of white lead or lead carbonate (ceruse). In an ordinary city atmosphere, although it may contain at any one time only minute quantities of sulphuretted hydrogen, these whitened parts will in time become discoloured and finally quite black, owing to the conversion of the white carbonate into black sulphide of lead. It has long been known that by means of a solution of hydrogen peroxide the black sulphide may be oxidised into the white sulphate of lead and the original whiteness restored. To apply such a solution to the great majority of drawings or water-colour paintings would almost certainly have disastrous results, even if the solution contained no other substances. Solutions of hydrogen peroxide are liable to contain sulphuric and phosphoric acids and also salts of barium. All these may be regarded as most objectionable impurities when considering the treatment of prints. By preparing a flat block of stucco, by casting plaster of Paris in a simple mould and then drying the block, we have a means of applying hydrogen peroxide in vapour, and therefore free from the impurities with which its solution may be contaminated. By distributing as uniformly as possible over the surface of the block a small

quantity of a concentrated solution of hydrogen peroxide an active surface is obtained. On placing a blackened print face downwards at a distance of an eighth of an inch or so, the hydrogen peroxide which comes off will restore the whiteness almost to its pristine purity in the course of a few hours (see Fig. 1 in the report). This treatment is also applicable to many of the mouldy spots (' foxiness '), as it tends to bleach their colour and render them much less apparent and disfiguring. This requires a much longer time than the whitening of lead sulphide (see Fig. 2 in the report).

The method above recommended might be all very well for a postage stamp or a print of philatelic proportions, but hardly seems suitable for such prints as, for instance, Landseer's " Laying Down the Law " or " Bolton Abbey." An inordinate amount of labour would be entailed in making a *waste* mould and the cast of plaster of Paris, to say nothing of the cost of *best plaster* (" super super, I think is what the Italians of Hatton Garden call it ").

The report still further states that: (*g*) " Drawings and prints not infrequently are stained and disfigured by oils and varnishes which have accidentally been spilt upon them,

and these stains, although originally transparent and colourless, in time acquire a brown tint more or less dark. Such stains do not yield to any of the ordinary bleaching agents or even to any of the usual paint-removing solvents. As the coloured material might be in the main oxidised oils, and therefore probably of a more or less acidic nature, it was resolved to try a strong anhydrous base, pyridine. This was applied by means of a brush of silky glass fibre, and the liquid after a short time was removed by pure white blotting-paper. After several applications of the pyridine and the blotting-paper, large stains were so greatly weakened that their presence would not be detected by a casual observer, although if sought for could be found without much difficulty. The drawing treated was by Watteau, and the stains probably dated from the time of the drawing (1710–1720). The removal of the stain, which was about an inch in diameter, revealed some rough sketches on the back of the paper which had previously been hidden by the stain.

"The pyridine (which must be colourless and dry) very rapidly evaporates and leaves the paper undamaged in toughness. When the paper is free from the smell of the pyridine it

may safely be concluded that all has evaporated." And so ends the report.

In examining the specimens given in Dr. Scott's report I can see no striking improvement; on the contrary, so far as one can judge from the process—block illustrations—the drawings treated seem to have lost some of their original details.

As regards the pyridine recommended, I suppose it is the volatile liquid alkaloid obtained from dry distillation of bone-oil, and used in medicine for asthma, but having no knowledge of this alkali, I am not qualified to comment on its action with drawings and prints. Suffice to say that after experience of more than forty-five years I am still content with old methods which I have set out in this work, and as they seldom fail they

> "Make us rather bear those ills we have
> Than fly to others that we know not of."

CHAPTER XX

THE CARE OF PICTURES AND DRAWINGS

FIRST and foremost in the care of oil paintings, the question of covering them with glass is one on which there is much difference of opinion. Many are unfavourable to glazing, partly as interfering with the view of pictures, partly as tending to impede the circulation of air essential to their preservation. Be this as it may, one thing is perfectly certain—that wherever glass is used in public galleries for protecting oil paintings from noxious deposits I have invariably found that pictures so protected were in far finer condition than unprotected ones. Indeed, one might say that if some masterpieces which have mouldered away into oblivion had been protected by glass we should have had them now, more or less in their pristine beauty, showing blue hills and the delicate pomp of summer skies with their golden moods and purple splendours, a little dimmed by the years, but still of very lasting loveliness.

Many pictures in certain collections are little more than blank spaces of darkness except for an occasional high light which looms through the surrounding gloom. It is folly to imagine that these examples, for instance, of Italian painters were ever originally so produced. On the contrary, light, which has so much force in pictures that therein consists almost the whole grace thereof, was a great feature with the Italians. As examples of the art of exquisite effects of light together with the colours we may take almost any piece by Raphael, Da Vinci, Correggio, or Titian. It is said of the last named that to make known his art in lights and shadows he would express the lightest part of the body by adding a little too much white, making it much lighter than his model, and in the obscure parts, where the light fell by reflection, a little too much shadow, in resemblance of the falling off of the light in that part of the body. Consequently, Titian's work has the appearance of being much raised, and deceives the sight.

Others have painted their principal figure in bold relief against a marble column, while its chromatic value is enhanced by the opposition of a dull crimson tunic worn by a negro

boy. Again, the liberal use of white in the architectural features of pictures of the fifteenth- and sixteenth-century masters contributes very largely to their success and forms an admirable foil for the rich colours used in Venetian costumes.

If, therefore, the masters who produced these superb pictures were so particular in their production, we who inherit them ought certainly to be careful as to the best means of preserving such priceless objects from deterioration or decay. A few notes regarding the care and cleansing of pictures may be of interest.

The term "picture cleaning," in its more familiar sense, indicates the removal, by various chemical processes, of the old varnishes or incrustations by which a painting may be obscured. There are, however, other operations connected with picture-cleaning which consist in the mere wiping, dusting, or otherwise slightly cleansing of the surface of a picture. These, though they do not require any very great skill, nor entail any risk, are nevertheless important, inasmuch as due attention to them tends to the preservation of pictures, and may obviate the necessity of cleaning in the larger sense of the word.

As regards the mere wiping or dusting to remove any dust and dirt lying on the surface of a picture, this may be done with a 3-inch or 4-inch broad varnish brush or old silk handkerchief. For the removal of chill or bloom, as it is technically called, which arises from varnish, particularly from pure mastic varnish, and gives a dull, filmy look to the surface of a picture, various methods have been from time to time recommended. Those commonly in use are friction with a silk handkerchief or wash leather, and the application of a damp sponge or a moistened pad of cotton wool, after which the picture is wiped with a soft cloth, and subsequently when dry, rubbed to a polish with a silk handkerchief.

It appears, from the Report of the National Gallery, that " with regard to the application of water to the surface of a picture, various opinions have been expressed. When a picture is painted on wood, with a tendency to chip, water, it is said, cannot safely be used, because subsequent rubbing might tear up some of the particles which are disposed to chip off. Again, in cases where the surface of a picture offers any fissures in the varnish, into which the water can penetrate, it may, if incautiously applied,

occasion blistering, and lay the foundation of future decay. Where the painting is on an absorbent ground, the risk of such mischief is increased. It has also been stated that some painters occasionally used water-colours in finishing their pictures, and, consequently, any cracks in the varnish would here render water destructive."

From experience I must say that the application of water in any case is injudicious and hazardous.

One of the best methods for the removal of "chill" or "bloom" and restoring the brilliancy of varnish is to take a piece of new flannel and, carefully folding it so as to form a soft pad, proceed to rub softly over the whole surface of the painting with a circular motion. After the chill or bloom is removed, finish by polishing with an old silk handkerchief.

Besides attending to the fronts of pictures, some means should be adopted to preserve the backs from the accumulation of dust and other impurities continually deposited on them. It is extraordinary what these accumulations sometimes consist of. I have found cards, private memoranda, holly and mistletoe berries, various insects and verminous deposits of filth which

were injuring the pictures. To obviate this state of things the backs of pictures should be protected, or should at least once a year be relieved of the dust or impurities which they may have contracted.

Pictures should not be tilted forward, but hung upright against the wall, so that dust may not accumulate upon their backs.

It is a good plan to have a small piece of cork at the four corners of a picture frame so as to allow for ventilation and prevent any injury to the picture in the case of damp walls. Another good plan is to cover the backs of oil paintings with water-proof brown paper. Apply as follows: Cut a piece of water-proof paper slightly smaller than the outside size of the picture frame. Slightly damp the brown paper on the plain side. Paste all round about an inch of the margin of the water-proof side and then stick it on to the picture frame so that the water-proof side is next to the painting. The paper will then dry taut and protect the painting from the accumulation of dirt, etc.

While on this subject I may point out that before framing up a picture, the moulding can be given a coat of sulphate of copper. If this is done the copper penetrates the pores

of the wood and is retained by the resinous matter present, and thereby the attacks of insects are prevented.

The stretchers of canvases should be looked to from time to time. Should any wedges be missing, new ones should be supplied and gently tapped so as to keep the canvas taut.

A few words are necessary as to the mounting of water-colour drawings. The back of the paper on which a drawing is made should not come into contact with anything but a best quality mounting board; even then it should only be laid upon it and fixed by a small quantity of fine paste run round the margins.

Glue or gum should never be used on either the back or front of a water-colour. Gum water is frequently used to heighten the colours, but this is a bad plan and will ruin them in time. However pure gum may be, the light, heat, or moisture will act upon it in time, causing one or other of the following defects, viz. a kind of bronzy sheen, cracking or peeling of the gum, mildew, or else fading of the colours.

When the glass of a water-colour drawing becomes cracked it should be replaced immediately with a new one, or the fumes of the sulphur contained in coal smoke or gas fumes will

penetrate the crack and leave a mark which is very difficult to remove. To clean a water-colour a piece of new bread or dough is far better than india rubber.

As pastels contain only a little binding material, drawings made with them are durable and the colours do not fade, but they must be protected by glass and not exposed to damp, otherwise the paper will mildew and the painting become spotted with various coloured mould. Fixing is often recommended for pastels, but whatever fixative is used and however carefully it may be sprayed upon the pastel, experience proves that the delicacy and bloom of the colours is lowered in tone.

CHAPTER XXI

ABOUT OLD POTTERY

OF the vestiges of the primeval tribes by which Britain was occupied we have very few beyond flint arrow-heads, celts, and scrapers. Little or no pottery, for

"Geological evidence goes
To prove he had never a pan,
But shaved with a shell when he chose,
'Twas the manner of Primitive Man!

He worshipp'd the rain and the breeze,
He worshipped the river that flows,
And the Dawn, and the Moon, and the trees,
And bogies, and serpents, and crows;
He buried his dead with their toes
Tucked up, an original plan,
Till their knees came right under their nose,
'Twas the manner of Primitive Man!"

In the primitive mode of sepulture alluded to by Andrew Lang in the above ballad, the hands were raised to support the head, the palm of each hand resting against the lower part of the face. This mode of burial is supposed to

have been adopted by our warlike ancestors because of an idea prevalent even long after the Christian era that it was unworthy of a chief or warrior to die in his bed.

Although most of the urns of the pre-historic period are of the coarsest manufacture, in shape far from classical, and with no pretension to decoration beyond a profusion of scratchings without method or design, it is quite possible that the Britæ, or Britons, got their first idea of making pottery from the Greeks, who made trading voyages here long before the birth of Christ, and improved their designs when the Romans came to stay.

Although Julius Cæsar made no conquest of Britain, the Romans under Claudius obtained a footing which the Britons were unable to resist; and from this time onward several of the Emperors were themselves in Britain, notably Severus and Constantius Chlorus, who died at York. The Roman occupation continued till the time of Honorius, when the inroad of Alaric and the Vandals into Italy caused the recall of the Roman legions in Britain, never to return.

For many things we have to thank the armed legions of Rome who first trod our island as

invaders; they came not alone as conquerors, but fulfilled in reality and fact a far higher and nobler mission. They brought to the *terra incognita* of Britain, "to the isle surrounded by sea, beyond Gaul," and to its painted denizens, not alone the arms, but the arts of civilisation. Surrounded by the all-sufficient force of discipline, they were the still more powerful possessors of knowledge, and opposed to the naked bodies of the Britons, the fierce valour of our forefathers only availed to render the slaughter of the English warriors more general and complete. But subjugation of the land was yet a greater gain to the conquered than to the conquerors. From sunny Italy they brought the arts of peace. Roads soon stretched across the breadth and along the length of the land, teaching the power of concentrated exertion, and bestowing the advantages of internal traffic and communication. Houses, fortifications, and *streets* were constructed with such powers of durability that even to our day may portions here and there be traced out owing their firm foundations to the Roman era. The Romans derived the potter's art in the first place from the Etruscans, and afterwards from the Greeks, but cannot be said to have

greatly excelled in the plastic art, for, being a ruling people, their martial propensities made them consider the culture of the arts as a profession worthy only of slaves, freed men, or of strangers whom they had subdued. But when the Romans became acquainted with the beautiful works of Greece and Asia, a taste for them was developed, and excited the emulation of the Roman artists, and they succeeded in producing some very beautiful works. The Greeks evinced a predilection for the nude, but the Romans exhibited a decided taste for draped figures. This requirement of Roman taste was very unfavourable to the development of the beauty of art. The figures seldom trespass against the rules of design, but they are deficient in elegance; they seldom bespeak either genius or elevation of mind in the artist. The ideal which is the soul of Greek composition, is never perceived in that of the Romans; and art began gradually to decline from the time of Septimus Severus.

Whatever doubts may exist as to the Romano-British manufacture of Samian ware, there can be no question that coarser kinds of pottery were produced on a large scale in this country during the Roman occupation.

Anyone who has sailed up the Medway will have observed that the left bank of the river, a little above Sheerness, consists of low, flat ground, cut by the water into innumerable little creeks, and at high water almost buried by the sea. This is called the Halstow and Upchurch marshes. In the time of the Romans the channel of the river appears to have been here much narrower, and the "marshes" had not been encroached upon by the sea as they are now. If we go up the little creeks in the Upchurch marshes at low water, and observe the sides of the banks, we shall soon discover, at the depth of about three feet, more or less, a stratum, often a foot thick, of broken pottery. This is especially observable in what is called Otterham Creek, and also in Lower Halstow Creek, where it may be traced continuously in the banks, and may be brought up by handfuls from the clay in the bed of the creek. This immense layer of broken pottery has been traced at intervals through an extent of six or seven miles in length, and two or three in breadth, and there cannot be the least doubt that it is the refuse of very extensive potteries, which probably existed during nearly the whole period of the Roman occupation of Britain.

Large quantities of Roman and mediæval antiquities were discovered in the excavations for the General Post Office in St. Martins-le-Grand, Temple Bar, Tower Hill, and numerous other parts of London. They consisted mostly of Samian and Early English pottery, together with coins, glass, and other objects, recovered from depths varying from ten to twenty feet from the surface level. In these and other discoveries made on Roman sites and stations in this country red and black pottery is among the most frequent of the objects found.

Between the middle of the seventeenth century and its close commenced the manufacture of the fine earthenware, which, without attaining the excellence of porcelain, constituted a great improvement on the previous products of this industry.

The establishment of the Potteries in Staffordshire originated from the circumstance of a strata of good plastic clay being found there in immediate juxtaposition with the coal necessary for its conversion into the fabricated article.

Before the commencement of Wedgwood's labours the English pottery produced wares flimsy in their materials, grotesque in their forms, and utterly destitute of correct taste in

their ornamentation, being miserable copies of the Chinese porcelain. Owing to the influence of the enterprise and genius of Wedgwood, the style and character of the ceramic manufacture of the country was thoroughly reformed, so that not only have the productions of Staffordshire, Derbyshire, Worcestershire, London, and other places where this industry has been established, superseded foreign goods in the home market, but they have spread over the whole civilised world.

Until the Paris Exhibition of 1867 very little was known of Japanese art. As the articles at this Exhibition were for sale, and passed into the hands of collectors all over Europe at comparatively small prices, it will always remain a matter for regret that no descriptive catalogue was prepared of this superb collection, and as no one appears to have visited Japan for the express purpose of investigating the arts and art thoughts of its inhabitants, it is very likely that at no very distant date, owing to the great changes which modern civilisation, modern intercourse, earthquakes, and wars have lately made and are making every day, but little will be found remaining of the art works of "Old Japan," the

"Land that mused while the world was striving!
Land that dreamed while the nations fought!"

Yet thou hast risen and conquered,
Thou dost stand, armed as a modern People
In the front rank—and yet I say alas!
Who could have wished, in waking thou shouldst spurn
The wondrous rightness of thy sheltered past?
To be as others are thou seem'st to yearn,
And for mere useful ugliness dost cast
For ever from thee beauties unsurpassed.

Dr. Kæmpfer, one of the oldest and best authorities on Japan, writing at the close of the seventeenth century, says, "as to all sorts of handicrafts, the Japanese are wanting neither proper materials nor industry and application, and so far is it that they should have any occasion to send for masters abroad, that they rather exceed all other nations in ingenuity and neatness of workmanship."

The Chinese have always been too conservative to change or learn from others, while the Japanese, ever ready to benefit from the superior knowledge of those with whom they were brought in contact, readily adopted what little the Chinese or Coreans could teach them and put upon the borrowed ideas their own impress. In most instances of ornamental art the Japanese are superior to the Chinese, and their taste is

more correct and refined than that displayed by the artists of the Celestial Empire; nevertheless, the wares of China are more fashionable now and fetch very high prices, but I cannot help thinking that a time will come when the old wares of Japan, which at the present time may often be picked up for a song, will command high prices too. Apart from this it should be remembered that rooms, large, lofty, or even small-proportioned ones, are dignified by art treasures whether Chinese or slender Japanese pieces; and arranged with taste never fail to give almost any room an appearance of dignified calm.

The Japanese generally repair their art pottery with a gold lacquer, but this does not look so neat as repairs made with one of the many cements sold for the purpose. The first thing to be done is to clear all the edges of dust and dirt. They should then be brushed over with a solution of patent size to stop suction. As soon as this is dry the fragments are ready for the cement, which should be applied thinly with a camel-hair brush and the pieces pressed tightly together. They should then be laid by in a warm place to dry. If there are a large number of pieces, do not try to join up too

many at one time, because in pressing one part another may become dislocated. If there are any fragments missing these may be made good with *superfine* plaster of Paris. A sixpenny bag procured at one of the plaster shops in or about Leather Lane, Holborn, will repair dozens of pieces. Plaster of Paris should be kept in a tin canister and stored in a dry place. When making any repairs proceed as follows: With a hog-hair brush damp round the edges of the parts to be made good. Then take a small quantity of the plaster of Paris and put it into a tea-cup and mix with water till about the consistency of thick batter. With an old teaspoon or a bone mustard spoon take up a small quantity of the wet plaster and build or model in the missing parts roughly. In a few minutes the plaster will set and harden somewhat. While in this condition it can be pared and cut away to the shape of the repaired article. If not smooth enough, it can be further smoothed with a piece of *wet* sand-paper and then put by for a day or two to get quite hard dry, when it will be ready for any decoration. Before doing any decoration the parts that have been made good should be painted with boiled oil, and when this has dried in the missing parts

may be matched and touched in with oil-colours and varnished. An excellent varnish may be made for this purpose by putting an ounce of copal of an amber colour, finely powdered, into a glass flask containing four ounces of ether; corking the mixture with a glass stopper, and shaking it for half an hour; then allowing it to rest till the liquor becomes clear.

The great volatility of ether, and its very high price, do not allow the use of this varnish for ordinary purposes. It has some admirable properties which belong to no other varnish. It presents great resistance to the friction of hard bodies, possesses remarkable solidity, has a peculiar drying quality, and a very fragrant odour.

Another finish for repaired china and pottery is soluble glass—a thick syrupy liquid made by melting together sodium carbonate and siliceous sand. It may be mixed with water, and if painted over repairs is decomposed by the action of the carbon dioxide in the air, a film of silica or silicate being left, forming a hard protective surface or enamel on the china.

Formerly broken china and porcelain was repaired with rivets. They were of little use as regards strengthening the plate and withal

very unsightly. By far the best method is to join the broken parts with a strong cement, and if the joint is properly made there is not the slightest fear of its coming apart.

A good cement for broken china or glass. Soak isinglass in water till it is soft, then dissolve it in the smallest possible quantity of proof spirit, by aid of a gentle heat. In 2 ounces of this mixture dissolve 10 grains of ammoniacum, and whilst in a liquid state add half a drachm of mastic, dissolved in 3 drachms of rectified spirits; stir well together and put into small bottles.

Liquefy the cement by standing the bottle in hot water, using it directly on the edges of the broken article. The great point is to press the parts very tightly together; after this has been done it is not a bad idea to wind some fine twine round the broken parts where it is possible till the joint is hard dry. Another useful thing when repairing valuable china is a linen bag, filled with dry sand. This when placed on an ornament or vase which needs even pressure can be easily adjusted to the contour of the article by applying slight pressure to the bag

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